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HANDBOOK

OF THE

GUN, MACHINE,

POLSTEN,

20 MM. MK.I.

1944

By Command of the Army Council,

I. Darnley.

FOREWORD

This handbook is issued with the object of providing the user with a handy reference work on the Gun, Machine, Polsten, 20 mm., Mk. 1, and its accessories.

It will be found to contain all the technical information necessary for the efficient maintenance of the gun and its magazines both at home and in the field. No attempt has been made to lay down any drill as this is covered by the relevant Small Arms Training pamphlet.

Appendices I to V will simplify the replacement of parts and they contain all the information necessary to this end. In addition, Appendix I has been arranged to be of assistance in stripping, as the assemblies, groups, and components of the gun are given in the order in which they should be stripped.

The plates are intended not only to illustrate adequately the text but to assist in the identification of component parts. For this purpose all items covered by Appendices I to V have a plate reference which is given in the form of the plate letter followed by the number attached to the required item on that plate.

It should be noted that this handbook covers only the Polsten gun and its accessories. For information on any of the mountings on which the gun may be used reference should be made to the relevant handbook.

SECTION I

INTRODUCTION

1. The Polsten machine gun is a 20 mm. weapon which has been designed primarily to fulfil an anti-aircraft role against low flying aircraft.

It is similar in principle to the 20 mm. Oerlikon gun now being used by the Navy, and it fires the same High Explosive, Incendiary, Tracer and Armour-piercing ammunition. This makes it an extremely effective weapon when employed in the A.A. role.

In a secondary role it may be used with good effect against ground targets, e.g., soft transport and lightly armoured vehicles.

There are several Mountings on which the Polsten is used (No. 2 Universal Mtg., Mk. I. Haszard-Baird Mtg., 20 mm. Triple Mtg., etc.), but it can be fitted, with slight modification to the firing gear, to other mountings on which the Oerlikon gun is normally carried.

A spare barrel is provided with each gun. The barrel can be changed quickly and easily, and this should be done frequently in order to reduce overheating and the consequent excessive barrel wear.

GENERAL DESCRIPTION

2. The Polsten 20 mm. machine gun is a fully automatic weapon with no single shot mechanism. Its rate of fire is approximately 450 rounds per minute and its M.V. is 2,725 ft. per second.

The gun is of the "blowback" type, i.e., the action is not locked when the round is fired, but the breech block is still moving forward at the instant of firing. The chamber pressure set up by the explosion drives the bullet along the barrel and forces the empty case against the breech block head, thus first arresting the forward movement of the moving parts and then driving the breech block to the rear and compressing the barrel springs.

The principal features of the gun are :—

- (a) Very quick barrel change. A spare barrel is supplied with the gun. There is no other cooling system.
- (b) A double loading mechanism to prevent a second round being fed in when there is an obstruction in the chamber.
- (c) An Interlocking mechanism to ensure that the gun remains cocked and the sear locked when the magazine is empty, thus avoiding re-cocking by hand.
- (d) A Buffering system which reduces both backward and forward force of impact.

Barrel Group

The barrel (C.1) is attached to the body by interrupted collars and is locked in position by the barrel retainer (G.18) which is spring loaded and housed in the top front part of the body. To facilitate assembly to the body, the barrel is provided with two indicating arrows marked "Insert" and "Locked." Towards the rear end of the barrel and projecting into the chamber is the double-loading stop (C.3) which is retained by its spring (C.2).

Barrel Casing

The barrel casing (D.4) fits over the barrel and houses the two barrel springs (D.5 and D.7) these being separated by the barrel spring sleeve (D.6).

Body Group

The body (C.4) is of circular cross section ; reduced internally at the front end, within which is formed interrupted collars to correspond with those on the barrel.

The front block houses the double loading assembly and the barrel retainer assembly. At the rear of this block are two trunnion hooks which, in conjunction with the magazine catch, hold the magazine in position. The magazine catch (H.4) is operated by the magazine catch lever (H.3).

At the rear and on the top of the body is fitted the firing mechanism assembly (E.6) with the safety catch on the left side. The trigger (E.16) protrudes from the rear of this assembly through the firing mechanism retainer bracket (E.5) which is held in position by the body plug (E.1) which closes the rear end of the body.

Two slots, one in each side of the body, act as guides for the cotter (D.3) which passes through the breech block (F.1) and is attached at each end to the barrel casing (D.4) by means of bushes (D.2) and split pins (D.1).

The hammer cam (C.6) is fitted in dovetail slots in the left underside of the body at the front of the magazine opening.

The feet on the underside of the body serve to secure the gun to the mounting from which it is to be fired. The front foot is recessed to receive the gun securing plunger of the mounting.

The ejection opening is a long slot between the two feet on the underside of the body.

SAFETY ARRANGEMENTS

3. When the gun is mounted on the Universal mounting it is fired by the hand firing gear (Plate N) which is part of the mounting, being attached to it by four bolts. The firing gear is connected to the gun by a cable, the outer end of which is connected to a trigger lever (B.1) mounted in the tubular portion at the top of the firing mechanism retainer bracket (E.5).

The safety catch on the gun must always be set at " Fire " when the gun is fitted to this mounting, the safety catch on the hand firing gear on the mounting being used in its place.

***Cocking Attachment**

4. The Cocking attachment (Plate N) consists of a plate and two ropes which are attached to it by two " U " -bolts. The gun is cocked by placing the plate over the barrel and against the front of the barrel casing, and pulling rearwards on the ropes until the rear end of the barrel casing coincides with the white groove on the body.

Loading the Gun (Magazine)

5. Cock the gun and put the firing gear (on the mounting) to " Safe." Raise the magazine catch lever until the magazine catch retainer engages. Place a filled magazine on the magazine opening of the gun and engage the trunnions at the front of the mouthpiece with the corresponding hooks at the front end of the magazine opening. The rear of the magazine can now be lowered and the retainer is automatically released, so locking the magazine in position. Test for security by attempting to withdraw the magazine vertically. The gun is now loaded and at " Safe."

Unloading the Gun (Magazine)

6. With the gun cocked, put the firing gear (on the mounting) to " Safe." Push the magazine catch lever forward and remove the magazine by raising it rear end first. Ensure that a round has not been left in the breech.

If the gun is not to be reloaded immediately, the magazine catch (H.4) must be released and the recoil mechanism allowed to go forward under control.

NOTE.—The breech block must never be allowed to fly forward on an empty chamber, as this is liable to cause the firing pin (F.6) to fracture. The mirror reflector (M.10) must be used to ensure that the chamber and bore are clear.

SECTION II

STRIPPING AND ASSEMBLING—MECHANISM

When mounted on the Universal Mounting the firing cable must first be uncoupled and the gun removed from the cradle.

NOTE.—Operations marked with an asterisk will only be performed by an armourer or trained N.C.O.

Stripping the Gun

7. A List of special stripping tools is given at Appendix V.

(i) **Ensure that the gun is unloaded and the breech closed.**

(ii) **To remove the Barrel**

(a) Lift the barrel retainer head (G.17) and rotate it through 90 degrees so that it rests on the top surface of the body.

(b) Rotate the barrel anti-clockwise (looking from the muzzle) until the arrow marked "INSERT" coincides with the line on the front of the barrel casing. When the barrel is hot this may be done by placing the combination tool (M.18) over the recesses in the barrel.

(c) Withdraw the barrel.

(iii) **To remove the breech block**

(a) Remove the split pins (D.1) and bushes (D.2) from the barrel casing with the aid of the combination tool.

(b) Compress the barrel springs (D.5 and D.7) slightly, by pushing the barrel casing slightly to the rear, and withdraw the cotter (D.3).

(c) Remove the barrel casing (D.4), barrel springs (D.5 and D.7) and barrel spring sleeve (D.6).

(d) With the combination tool depress the BODY PLUG CATCH (E.3) and unscrew and remove the body plug (E.1.)

(e) Remove the firing mechanism retainer bracket (E.5).

(f) Withdraw the firing mechanism (E.6) to the end of its slot, and remove by raising the rear end first, thus preventing the INTERLOCK ROD (H.8) from becoming damaged.

(g) Remove the breech block.

(iv) **To dismantle the breech block**

(a) With the awl (M.1) lift the BREECH BLOCK HEAD SPRING (F.3).

(b) With the combination tool (M.18) turn the BREECH BLOCK HEAD (F.2) through 90 degrees and withdraw.

(c) Remove the breech block head spring (F.3).

(d) Use the screwdriver to turn the HAMMER PIN (F.4) through 180 degrees and push it out.

(e) Remove the HAMMER (F.5) and the FIRING PIN (F.6).

* (f) Remove the buffer plug screw (F.7).

* (g) Unscrew and remove the buffer plug (F.8) with the combination tool.

* (h) Remove the BUFFER (F.9) BUFFER SPRINGS on their rod (F.11 and F.12) and the BREECH BLOCK BENT (F.13).

***(v) To dismantle the firing mechanism**

- (a) Rotate the safety catch (E.8) to a vertical position and withdraw it.
- (b) Push out the SEAR PIN (E.9).
- (c) Hold the firing mechanism casing (E.7) in the right hand and press the trigger (E.16) against the body or a table. With the trigger pressed, place the right thumb on the front portion of the sear (E.11) and line up the sear catch pin (E.10) with the small hole in the casing. Remove the sear catch pin by pushing it with the small finger inserted in the large hole on the opposite side of the casing.
- (d) Remove the sear (E.11) sear spring (E.12), sear catch (E.13) and guide (E.14), and spring (E.15).
- (e) Remove the trigger (E.16) and trigger spring (E.17).
- (f) Withdraw the Interlock rod stop (E.18) taking care to control the release of its guide (E.19) and spring (E.20).

(vi) To remove the double loading mechanism from the body

- (a) Push out the split pin (G.1) and bush (G.2) taking care to control the upward pressure of the double loading lever (G.3) and spring (G.6).
- (b) Remove the double loading lever (G.3) spring (G.6), and guide if fitted.

NOTE.—A number of guns have a packing piece inserted under the double loading lever spring. Care must be taken that this is not lost.

- (c) Unscrew the barrel casing stop screw (G.7).
- (d) Remove the barrel casing stop lever (G.8) and spring (G.9)
- (e) Push out the barrel casing stop (G.10).
- (f) Remove the double loading plunger (G.13) by pushing out its pin (G.11) with the punch and lifting the collar (G.12).

(vii) To remove the double loading stop from the barrel

- (a) With the awl (M.1) raise the end of the DOUBLE LOADING STOP spring (C.2) over the stop (C.3) and withdraw it.
- (b) Remove the double loading stop (C.3).

(viii) To remove the barrel retainer assembly from the body

- (a) Lift the BARREL RETAINER HEAD (G.17) and insert the end of the combination tool (M.18) under it.
- (b) Unscrew the sleeve (G.15)
- *(c) Remove the BARREL RETAINER PIN (G.16) with the punch and withdraw the barrel retainer (G.18).

(ix) To remove the magazine catch from the body

- (a) Raise the magazine catch lever (H.3) until the magazine catch retainer (H.6) engages and holds the magazine catch (H.4) to the rear.
- (b) Push out the split pin (H.1) and bush (H.2).
- (c) Remove the magazine catch lever (H.3).
- (d) Depress the magazine catch retainer (H.6) on the left side of the assembly, allow the assembly to move forward under control, and remove it.

(x) To dismantle the interlock catch assembly

- (a) Remove the magazine catch spring (H.5) and magazine catch retainer (H.6).
- (b) Retain control and trip the interlock catch (H.11) by pushing it downwards.
- (c) Compress the interlock rod spring (H.10) slightly and remove the interlock catch pin (H.7) thus releasing the interlock rod spring (H.10), interlock catch (H.11), and bush (H.9).
- (d) Remove the interlock catch spring (H.12).

Re-assembling the gun

8. Assembling is in the reverse order to stripping. The following points must be noted :—

- (i) See that the barrel spring sleeve (D.6) is fitted correctly between the barrel springs, and that the short spring (D.5) is to the rear.
- (ii) Ensure that the rear face of the buffer plug (F.8) is flush with the rear face of the breech block (F.1) before replacing the buffer plug screw (F.7).
- (iii) Assemble the interlock catch spring (H.12) with the "T" portion in the slot, tail to the rear and concave surface uppermost.
- (iv) When assembling the magazine catch (H.4) to the body, push the catch against its spring with the tool (M.18) or other suitable object, until the magazine catch retainer (H.6) clicks into position behind the lug on the body.
- (v) When assembling the sear catch pin (E.10) fit the spring (E.15), guide (E.14), and catch (E.13), into the sear (E.11), then drop the sear into position in the casing (E.7). Fit the sear catch pin through the small hole of the casing and partly through the sear, then, using the awl (M.1), line up the holes of the catch and sear to allow the pin to be pushed through. The head of the pin will come to rest against the outside of the casing, but can be centralized, using the flat of the awl, and then pushed through to its final position.

ACTION OF GUN MECHANISM.

Forward movement

9. On pressing the trigger (E.16) the breech block (F.1) is released from the sear (E.11) and travels forward under the influence of the barrel springs (D.5 and D.7). The horns on the breech block head (F.2) come into contact with the base of the first round in the magazine, forcing it forward and downward towards the chamber.

The mouth of the chamber is shaped to guide in the nose of the round. The round is thus aligned with the axis of the bore, and the base of the cartridge slides down the face of the breech block head until the rim of the cartridge rests in the lip.

Firing

The forward movement continues until the round is about $\frac{1}{2}$ in. from the fully home position, when the rear toe of the hammer (F.5) comes into contact with the rear face of the hammer cam (C.6). The hammer is then rotated on its axis pin (F.4) thus forcing the firing pin (F.6) forward and firing the cartridge cap. No locking of the breech takes place.

Rearward movement

On firing, the forward movement of the breech block is arrested by the chamber pressure, which forces the empty cartridge case against the face of the breech block head and thus forces the breech block to the rear, compressing the barrel springs.

At the commencement of the rearward movement, the front toe of the hammer rides against the front face of the hammer cam, thereby rotating the hammer rearwards and withdrawing the firing pin.

Ejection of empty cartridge case

The empty cartridge case is supported by the lip on the breech block head (F.2) until the top edge of the base of the case comes into contact with the projection on the underside of the magazine catch (H.4) which forces the case downwards through the ejection opening in the underside of the body.

The breech block continues its rearward movement until the buffer (F.9) at the rear of the breech block comes into contact with the body plug (E.1). Any surplus energy possessed by the recoiling parts is now absorbed by the buffer springs (F.11) housed in the breech block.

The barrel springs then re-assert themselves and drive the breech block forward again, so repeating the cycle.

Action of trigger mechanism

On turning the safety catch (E.8) forward to the "Fire" position, the safety catch spindle is rotated so that the cut-away portion is in line with the trigger. This allows the trigger to be operated.

When the trigger (E.16) is pressed, compressing the trigger spring (E.17), the front end of the trigger forces the arm of the sear catch forward until the shoulders on the sear catch disengage from those of the insert (E.21), which is fitted in the firing mechanism casing (E.7).

The forward movement of the sear catch compresses the sear catch spring housed in the sear. Until the shoulders on the sear catch disengage from those of the insert, the sear catch cannot rise and the sear remains locked.

At this stage the breech block is tending to move forward under the influence of the barrel springs through the medium of the barrel casing (D.4) and cotter (D.3). The inclined face of the bent (F.13) forces the sear, which is now free to rise, up against the sear spring, and the breech block continues forward. When the bent has passed under the sear, the sear spring re-asserts itself, and the sear assumes its original position.

During the rearward travel of the breech block, the bent rides under the sear, compressing the sear spring. When the bent has passed the sear, the sear spring re-asserts itself and lowers the sear. The rearward movement of the breech block is arrested by the action of the buffer on the body plug. The breech block then commences its forward movement. Since the sear catch is still held forward by the trigger, the bent pushes the sear up, and when clear, the sear spring again re-asserts itself. This cycle of operations is repeated as long as the trigger remains pressed.

When the trigger is released, the sear catch spring re-asserts itself, thus allowing the shoulders on the sear catch to re-engage those on the insert in the casing. If at this instant the bent is to the rear of the sear, the forward movement of the breech block will be arrested by the sear which is now locked.

If the bent of the breech block is in front of the sear when the trigger is released, then, as the breech block moves to the rear, the rear face of the bent trips the sear catch, thus freeing the sear for its upward movement, and allowing the bent to pass under it.

The sear catch now assumes its original position under the influence of its spring, and the sear is locked.

The forward movement of the breech block is arrested by engagement of the bent and sear.

Action of magazine interlock

On firing the last round in the magazine, the breech block will be held to the rear after the ejection of the empty case by the action of the magazine interlock assembly which operates as follows :—

With the gun loaded, and during firing, the interlock rod (H.8) is held in its forward position by the interlock catch (H.11), which engages in the slot in the underside of the magazine catch (H.4).

As the last round leaves the magazine, the interlock plunger (K.5 and L.9) carried in the platform of the magazine comes into line with a hole in the rear end of the magazine mouthpiece, and protrudes, forcing the interlock catch out of engagement with the magazine catch.

This action releases the interlock rod which moves rearwards under the influence of its spring, until the first stepped face at the rear end of the rod comes into contact with the interlock rod stop (E.18).

As the breech block travels to the rear, the ramp on its top left side trips the tail of the interlock rod stop, thus allowing the interlock rod to move rearwards until the second stepped face at the rear of the rod, engages the interlock rod stop. The ramp on the breech block is positioned so that this action takes place when the bent is behind the sear.

The rear end of the interlock rod is now above the front end of the sear, thus preventing the sear from rising when in contact with the breech block bent at the commencement of the forward travel.

On releasing the trigger, the sear catch returns to its normal position under the influence of its spring.

In order to remove the empty magazine, the magazine catch lever (H.3) is raised, which in turn moves the magazine catch (H.4) rearwards, compressing its spring. This allows the interlock catch (H.11) to re-engage in the slot in its underside.

The magazine catch retainer (H.6) which was held down by the shoulder in the body, is now free to rise under the influence of the magazine catch spring (H.5), which is bearing on the flat on the spindle of the magazine catch retainer.

The magazine catch retainer is now engaged behind the shoulder on the body, thus holding the magazine catch to the rear.

When a new magazine is placed on the gun, the left rear part of the mouthpiece forces the magazine catch retainer downwards out of engagement with the shoulder on the body, thus allowing the magazine catch to move forward under the influence of its spring, so retaining the magazine on the gun.

As the magazine catch moves forward, it carries with it the interlock catch and rod. The interlock rod is now held forward out of engagement with the sear, which is still prevented from rising by the sear catch. The interlock rod stop then returns to its free position under the influence of its spring, and the sear is free to be operated when the trigger is again pressed.

Action of double loading mechanism

The function of the double loading stop is to hold the breech open automatically should a cartridge or separated case be left in the chamber, so preventing the forward movement of the breech block and the feeding of the next round. It is one of the mechanical safety arrangements of the gun.

When the chamber is empty the forward end of the barrel casing stop lever (G.8) is held down by the rear end of the double loading lever (G.3) because the double loading lever spring (G.6) exerts, through the double loading lever, a greater downward pressure on the barrel casing stop lever than the upward pressure exerted on the latter by its spring (G.9).

When a round enters the chamber, the cartridge case forces the double loading stop (C.3) up. This in turn raises the double loading plunger (G.13) which bears on the underside of the double loading lever (G.3) thereby raising its rear end and compressing the double loading lever spring (G.6).

This allows the forward end of the barrel casing stop lever (G.8) to rise under the influence of its spring (G.9). This lever is rigidly attached to the barrel casing stop (G.10) and so rotates it.

The ends of the barrel casing stop are now in such a position that they will interfere with the path of travel of the pads on the barrel casing. During normal feed, this will take place when the pads are in front of the barrel casing stop.

Should a round remain in the chamber, the pads on the barrel casing will ride under the spring loaded barrel casing stop during the rearward movement. On commencement of the forward movement, the barrel casing together with the breech block, will be arrested by the pads on the casing contacting the ends of the barrel casing stop.

Buffering

At the end of the rearward movement, the buffer (F.9), which is secured in the rear end of the breech block by the buffer plug (F.8), strikes the body plug, compressing the buffer springs, which absorb the surplus energy.

The breech block bent (F.13) is a sliding fit in the body of the breech block, and its forward end houses the forward end of the buffer spring rod (F.12). When the breech block bent engages the sear, the buffer springs (F.11) are compressed from the front end, thus buffering the action. During normal functioning the bent is buffered when it contacts the sear at the commencement of each forward movement.

SECTION III

CARE AND CLEANING

Daily Cleaning

10. NOTE :—This type of gun is very reliable, but in order to achieve this condition continuously, a high standard of care and maintenance is required. Any dirt, corrosion or lack of lubrication sufficient to impede the free working of the moving parts, will cause stoppages during firing, therefore cleaning and oiling must be carried out regularly.

The following lubricants will be used for guns and magazines.

For cleaning purposes ...	Oil "A", Cat. No. HA.0119 (In temperatures below 20° F. dilute with Kerosene, vapourising).
For lubricating guns in cold and normal temperatures	Oil "A", Cat. No. HA.0119
For greasing rounds, maga- zines, and buffer springs ...	Grease No. 0

Coat the barrel bore with cleaning oil, using the cleaning rod and flannelette. Dry the bore, and finally lightly oil it by drawing through a piece of oiled flannelette.

Occasionally dry the bore of the spare barrel and re-oil with lubricating oil.

Clean all external surfaces exposed to the atmosphere and leave lightly oiled.

Cleaning after Firing.

11. (a) Strip the gun into its separate assemblies with the exception of the barrel retainer, double loading stop, and plunger unless any stiffness has been found in these components.
- (b) If stoppages have occurred determine the cause.
- (c) Coat the barrel bore with cleaning oil, using the cleaning rod and flannelette. After 10 minutes clean the bore with the bristle brush (M.11) soaked in cleaning oil, pushing it steadily up and down the bore several times. Dry the bore and if fouling is still present repeat the cleaning operation. Finally lightly oil the bore with lubricating oil.
- (d) The inside of the gun body, breech block head, breech block and all components showing signs of fouling should be treated with cleaning oil, wiped clean and lightly lubricated. During this operation examine the components individually for damage.
- (e) Re-assemble the gun and test for cocking and firing, allowing the working parts to go forward under control.

Emergency Maintenance after firing

12. If thorough cleaning after firing is not immediately possible the barrel and breech block head must be well oiled and the complete cleaning as in para. 11 carried out immediately an opportunity occurs.

Points requiring special attention

13. **Double loading mechanism.**—Will be tested for freedom in all parts by rotating the barrel casing stop by hand. The double loading stop will also be examined in the barrel itself for complete freedom of movement. If any stiffness is felt, strip, clean, and oil.

Breech block head. Will be examined for damage to the lips, and burrs round the firing pin hole. If damaged change the breech block head.

Hammer and firing pin. Will be examined for damage or breakage and, during assembly, for free movement in the breech block by rotating the hammer backwards and forwards by hand.

Barrel (especially the chamber). As the recoil of the gun is influenced by the amount of friction between the cartridge case and the chamber, it is essential that the latter should be maintained in good condition. Particular attention will be given to it when the barrel is being cleaned and oiled, but **on no account** will abrasives be used.

Buffer Springs. Will be examined periodically for breakages or damage. Broken or damaged springs are usually indicated by the rear end of the barrel casing taking up a position in front of the groove on the body when the gun is in the cocked position. The buffer springs will be well greased with Grease No. 0 on re-assembly into the breech block.

14. Removal of coppering from the bore.

- (i) Barrels will be examined for coppering after every 1,000 rounds fired. Plug gauges for this purpose will be supplied.
- (ii) If the gauge fails to pass through the bore, the brush soaked in cleaning oil will be pushed vigorously up and down the bore, after which the bore will be dried and re-gauged.
- (iii) If the gauge still fails to pass, the chemical method of de-coppering will be used, as follows :
 - (a) Prepare the undermentioned solution in the proportions shown :
 Ammonium persulphate Cat. No. HA.0019—1½ lb.
 Ammonia liquor Cat. No. HA.0018—5 pints.
 Water 4½ pints.
 - (b) Plug the chamber with a suitably shaped wood plug which seals the barrel in front of the double loading stop and place the barrel in vertical position.
 - (c) Fill the bore with solution and allow it to stand for three hours.
 - (d) Drain the bore, clean with the brush, dry, and re-gauge.
 - (e) Repeat the process if the gauge still fails to pass.
 - (f) Dry the bore and lightly lubricate it.

SECTION IV

GREASING OF AMMUNITION

Greasing ammunition before filling the magazine :—

15. The gun will not function unless the cartridge cases are greased. It is essential that each round should be lightly greased with Grease No. 0 before loading into the magazine. Oil must not be used. If stoppages are experienced in firing, symptomatic of short recoil, it should at once be ascertained whether the cartridge cases are sufficiently greased. A little grease applied shortly before firing to the cartridge case visible in the mouth of the magazine is advantageous.

Greasing will be done by hand, not with a brush.

SECTION V

MAGAZINE, 30 ROUND, 20 MM. POLSTEN, MK. I**Description**

16. The Polsten 30-round magazine is of the box type, rectangular in form, tapering at the bottom to a neck and to the usual type of magazine mouthpiece. When filled, it contains 30 rounds in two double columns, each column being operated by a separate platform and spring.

The pressure on the platforms is produced by two separate multi-leaf springs. These springs automatically produce the correct pressure on the round resting in the mouthpiece and no outside tensioning is necessary.

An "L"-shaped lever is issued with each magazine to assist filling and, when not in use, fits into slides at the rear of the magazine. A web strap carrying handle is fitted to the front.

Action of magazine (Plate O)

17. When the magazine is completely filled with 30 rounds, each platform is pressed down almost to the limit of its travel and each leaf spring is fully compressed. Fig. B shows a filled magazine with the rounds numbered in the order of filling. When loaded on the gun, the right hand column will feed out first (rounds 30 to 15) and rounds 1 to 13 will be locked in the left hand column by round 13 being forced into the recess in the partition. As the right hand platform moves down and finally reaches the end of its travel (Fig. C), a cam on the inner side pushes round 13 out of the recess and thus permits the left hand platform to feed its column (rounds 14 to 1). Round 14 is held against round 13 only by the passage of rounds from the opposite column.

Stripping an empty magazine (Plate K)

18. A list of names of the component parts of the magazine is given at Appendix II.

This and the subsequent re-assembly must be carried out by trained personnel only.

- (i) Stand the magazine (mouthpiece downwards) on a clean surface.
- (ii) Depress the two round projections protruding through the holes in the bottom plate, and withdraw the bottom plate a distance of 2 inches.
- (iii) Place a cloth over the end of the magazine and one hand over the cloth and grip the edges of the magazine in such a way as to hold the springs in check once the bottom plate is withdrawn.
- (iv) Withdraw the bottom plate.

- (v) Allow the springs to extend under control.
- (vi) Remove springs and platforms.

NOTE.—The springs should not be removed from the platforms except in an emergency, such as a broken spring, etc.

Re-assembling the magazine

- 19. Re-assemble in the reverse order to stripping.

Stripping a filled magazine

20. **NOTE.**—If the procedure for filling the magazine is not strictly observed, rounds may become jammed. If this occurs the magazine will have to be stripped when still completely or partially filled. In this case, additional care must be taken as the springs are under considerable compression and if suddenly released, are capable of causing injury.

Proceed to strip the magazine as follows (this can be carried out by one man, but will be done by two if an assistant is available).

- (i) Stand the magazine (mouthpiece downwards) on a clean surface.
- (ii) Depress the two round projections protruding through the holes in the bottom plate and withdraw the bottom plate a distance of 2 inches.
- (iii) Lay the magazine on its side on a smooth support (such as a table top or truck floor), preferably about waist height, with the partly withdrawn bottom plate just overlapping the edge of the support.
- (iv) Press the body firmly against the bottom plate, and hold the magazine in this position with one hand.
- (v) Withdraw the bottom plate.
- (vi) Lean well over the magazine in order to avoid any danger of the springs flying up into the face and, using both hands, allow the magazine to slide under control away from the body, so that the compressed springs can extend.
- (vii) Springs and platforms can now be withdrawn and the rounds removed.

Cleaning, etc.

21. In order to ensure perfect functioning, the magazine must be kept clean and undamaged. It will be inspected regularly for dents in the casing and for any damage to the mouthpiece. It will be stripped periodically and cleaned thoroughly inside and out and all surfaces lightly greased with Grease No. 0 to prevent rust.

It is not desirable to have any excess of oil or grease inside the magazine, as this merely tends to collect dust and dirt. A certain amount of grease may collect in the magazines from greased rounds, and this will be removed at regular intervals.

Filling the magazine

22. Withdraw the loading lever from the rear of the magazine. Stand the magazine on a firm flat surface, as low as possible, with the mouthpiece upwards and with the rear of the magazine towards you. Insert the long arm of the loading lever in the small slot in the right hand side of the magazine with the short arm pointing to the right. Press the right hand magazine platform down far enough to insert two rounds. (Pressure may now be released on the platform if desired.)

Now depress the platform until a line marked on the loading lever, 5 inches from the end, is level with the slot in the magazine body. The two rounds should now position correctly, i.e., the second round lying slightly to the right of the first or lower round (PLATE 0, Fig. A). If the rounds are not correctly positioned, give the magazine a sharp tilt to the right, this will cause the rounds to roll over.

Still holding the magazine platform in the same position, fill the magazine up to the top, this will take four more rounds.

Continue to depress the magazine platform one round width at a time. Assist the rounds down by pressing on the base of the top round, and at the same time inserting a further round. Continue until a further 11 rounds have been inserted, making 17 rounds in all. This completely fills the right-hand column.

Withdraw the loading lever and re-insert it in the small slot on the left-hand side of the magazine with the short arm pointing to the left. Depress the platform approximately three inches. At the same time, press lightly on the top round with the fingers of the right hand. A round should then feed down on to the left-hand platform. This will take place only with an odd number of rounds in the right-hand column. If the rounds do not press down easily, DO NOT PRESS HARD, but try depressing the right-hand platform further and inserting one more round or, if necessary, remove one round.

Now insert a further 13 rounds, depressing the left-hand platform one round depth at a time. The magazine is now full and the loading lever will be replaced in the slides at the rear of the magazine.

It is, of course, possible to load the magazine with less than 30 rounds. Any number up to 17 will be inserted in the right-hand side, and if more, the balance into the left-hand side.

NOTE.—As with other types of magazine incorporating an expanding leaf spring, it is undesirable that magazine should be left for long periods with the spring under full compression. Whenever possible, magazines will be unloaded, and the springs allowed to remain in the extended position.

Emptying the magazine

23. Withdraw the loading lever and stand the magazine with the mouthpiece upwards on a firm level surface. Insert the loading

lever in the left-hand slot and apply just sufficient pressure to the platform to allow the top round to be removed. Allow the platform to rise gradually, taking out one round at a time.

Continue this until the left-hand platform has reached its highest position. The left-hand column of the magazine is then empty.

Repeat this procedure with the right-hand platform.

SECTION VI

MAGAZINE, 20 MM. OERLIKON MK. II

NOTE.—As Polsten and Oerlikon guns are of generally similar design and use the same type of ammunition, the Oerlikon magazine can be used in place of the Polsten magazine.

Description

24. The magazine is of the cylindrical drum type designed to hold 60 rounds. It has an offset mouthpiece and can be either right- or left-handed. The rounds are fed to the mouthpiece along a spiral track inside the drum by the action of a strong spring. Initial tension is applied to the magazine spring when the magazine is assembled.

NOTE.—Every possible care must be taken to avoid rough treatment of the magazines, which are, of necessity, made light to assist handling.

Action of magazine

25. When the magazine is filled, the coupling sleeve (L.36) will be engaged with the teeth on the main spring hub (L.29) and the spring tensioned by the loading lever until a distinct stop is reached.

The tensioned main spring acting through the feed system maintains a pressure on the innermost round and ensures that a round is always in position in the mouthpiece of the magazine. As soon as a round is loaded into the gun the next round is brought into position in the lips of the magazine by the main spring.

Stripping the magazine

26. (i) See that the magazine is empty, and place in the loading frame. Remove six of the eight screws (L.35) retaining the cover plate.

Ensure that the cartridge feeder is up against the mouthpiece, by mounting the loading lever taking the tension of the spring, pulling out and unclutching the coupling sleeve (L.36), then, placing the slotted boss of the loading lever in the top of the feed shaft (L.18), and turning clockwise. Take the weight of the spring on the loading lever and remove the remaining two screws. Allow the lever to turn clockwise so that the initial

tension is released. Lift off the cover plate (L.34). If a tool is required to prise it off, care must be taken not to prise up the flange of the spring casing (L.1) at the same time.

- (ii) Lift up the coupling sleeve (L.36) until the head of the retaining collar pin (L.33) is opposite the hole. Unscrew the pin, and then controlling the coupling sleeve (L.36), retaining collar (L.25), and spring (L.37), push out the retaining pin (L.33). Remove the retaining collar, coupling sleeve spring, and coupling sleeve.
- (iii) Mark, if not already marked "O," the hole in the spring casing occupied by the main spring casing register. Prise the spring casing flange off the register, turn the spring casing until the letters "D" are in line, and lift out complete with the main spring and main spring hub.
- (iv) Turn the magazine over and remove the circlip (L.39) securing the rear end of the feed shaft (L.18). Turn the magazine back again and withdraw the feed shaft complete with feed block (L.17), feed arm (L.2) feed link (L.7), feed head (L.6) and cartridge feeder (L.5), care being taken to remove the washer (L.38) which will be left lying on the inside of the rear plate (L.15).
- (v) The feed arm, feed link, feed head and cartridge feeder can then be separated by tapping out their respective axis bolts which are secured by cross pins.
- (vi) The casing of the magazine will not be stripped into its component parts.

Cleaning, etc.

27. Clean all components and the inside of the magazine casing, and examine all parts individually for damage. Lightly lubricate all working parts before assembling. (See Sec. III, Para 10.) Damaged magazines will be submitted to an armourer for repair and adjustment.

Re-assembling the magazine

28. Assembling is in the reverse order to stripping. The following points must be noted :—

- (i) See that the feed shaft washer (L.38) is in its place between the feed block (L.17) and the inside of the rear end plate.
- (ii) Ensure that all rollers (L.10) engage in the same spiral track, and turn the feed shaft clockwise until the cartridge feeder is in the mouthpiece.
- (iii) Insert the magazine spring and its casing into the magazine with the letters "D" in line. Turn the casing until the hole marked "O" fits over the register on the front plate of the magazine.

- (iv) Ensure that the indicator block (L.19) is fitted into the slide of the cover plate (L.34) short end towards the centre. Assemble the cover plate loosely without screws, moving the indicator block with a knife blade or similar implement so that it engages in the spiral groove on the main spring hub. The indicator block may be engaged in the groove in any position.

Turn the cover plate anti-clockwise until the line on the indicator block coincides with the zero mark on the scale. Continue until it can be felt that tension is being applied to the main spring.

- (v) Assemble the coupling sleeve (L.36) together with its spring (L.37), the retaining collar (L.25), and the retaining pin (L.33), to the end of the feed shaft (L.18). Ensure that the retaining pin is screwed fully home. Set up the loading lever and tension the main spring approximately seven-eighths of a revolution, so allowing the cover plate to be rotated anti-clockwise until the marks "A" come in line. Secure in that position with the eight screws.

NOTE.—Approximately seven-eighths of a revolution should bring the marks "A" in line with each other, and care must be taken not to tension more than this amount. Similarly, **care must be taken not to bring the marks in line by turning clockwise.**

Testing and adjusting initial spring tension

29. NOTE.—All new magazines, and any magazine that has been stripped, should be tested for initial spring tension.

To test spring tension.—Place the magazine in the loading frame. Set up the loading lever and disengage the coupling sleeve. Attach the loop of the spring balance half an inch from the end of the loading lever handle. Pull on the spring balance, keeping it at right angles to the loading lever. The tension should be between 10½ lb. and 12 lb.

To adjust spring tension.—Disengage the coupling sleeve. Rotate the feed shaft by means of the boss on the side of the loading lever, until the cartridge feeder takes up its position in the mouth-piece. Remove the loading lever and engage the coupling sleeve. Remove the eight screws securing the cover plate. Set up the loading lever and wind until the correct tension is shown on the spring balance. Holding the correct tension, rotate the cover plate anti-clockwise until the indicator reads zero. Replace the eight cover plate screws.

If the mark "A" on the cover plate passes the corresponding mark on the front plate, when the correct weight is shown on the spring balance, the cover plate will be removed and the spring casing raised off its register and turned clockwise to the next hole

In the flange. If, after a further trial, the weight is found correct, the new hole will be marked "1" and in future this hole will be assembled over the register. Cases may occur after long use where it is found necessary again to re-position the spring casing. The holes will then be marked "2," "3," etc., and the spring casing assembled so that the hole with the highest number fits over the register.

Filling the magazine

30. NOTE.—Before filling a magazine it will be tested for freedom of its moving parts, by first ensuring that the indicator block is showing zero, after which the coupling sleeve will be lifted and the feed shaft rotated through its full travel by means of the boss on the side of the loading lever. If there is any stiffness, the magazine will be examined carefully for damage. Dents in the outer casing or end plates may foul the rounds, causing mal-alignment of the moving parts resulting in stoppages.

- (i) Put the magazine into the loading frame.
- (ii) Pull out the coupling sleeve, and turn it to such an extent that it cannot snap back.
- (iii) Engage the boss on the side of the loading lever with the collar retaining pin in the end of the feed shaft, and turn the lever clockwise until the cartridge feeder occupies its position in the mouthpiece.
- (iv) **Hold the loading lever firmly but lightly with the left hand so that touch between the cartridge feeder and innermost round is constantly felt. This will prevent the leading round falling over and so causing a jam.**

NOTE.—Great care will be taken to ensure that the above operation is carried out correctly. If the rounds do fall over and cause a jam, it may possibly be cured by moving the feed shaft with the loading lever. If this does not clear the jam, it will be necessary to strip the magazine.

- (v) Push the cartridge feeder inwards with the thumb of the right hand, far enough to enable one round to be inserted, base first. Ease the round down with the thumb of the right hand to prevent shock on the cap. It is essential for proper functioning that the round is fully down on its base.
- (vi) The round in the mouthpiece will then be pushed into the magazine, by exerting pressure with the thumb of the right hand on the centre of the cartridge case, sufficiently far, **and no farther**, to allow the next round to be loaded into the magazine. This operation will be repeated until the magazine is fully loaded.

NOTE.—The last two rounds inserted into any magazine will be practice or armour piercing. This is necessary as under certain climatic conditions (ice, etc.), the air pressure in the barrel on firing, might not be great enough completely to blow off the bexoid muzzle cover. If this occurred, and the first round fired was a High Explosive, it is possible that this round would detonate on striking the remains of the muzzle cover left on the barrel.

(vii) When the magazine is filled engage the coupling sleeve.

(viii) Set up the loading lever.

NOTE.—When tensioning a filled or partly filled magazine the knurled coupling sleeve must be held with the left hand to prevent it from turning.

If the magazine is to be stored, give the spring a slight tensioning by turning the loading lever anti-clockwise through two clicks. If this is not done, the rounds are liable to fall out or get disarranged on removing the magazine from the loading frame.

If the magazine is to be used, the spring must be tensioned according to the number of rounds in the magazine. The tension on the spring is shown by the line on the indicator block. This should stand at the number corresponding to the number of rounds in the magazine. With a full magazine, tension must be at the maximum. When this is reached a distinct stop will be felt.

Releasing the tension of a filled magazine

31. (i) Put the magazine into the loading frame.
- (ii) Set up the loading lever in such a manner that it may be moved clockwise.
- (iii) Push the lever anti-clockwise, and maintain the pressure, while the coupling sleeve is disengaged with the other hand. Allow the lever gradually to turn clockwise as far as possible.
- (iv) If all tension is not now removed, engage the coupling sleeve.
- (v) Turn the loading lever back to the starting position by pressing on the pawl. Release the pawl, and repeat (iii) until all tension is completely removed.

NOTE.—If the magazine is to remain filled, the spring must be given a slight tension before taking the magazine out of the loading frame.

Emptying a filled magazine

32. (i) Release all tension.
- (ii) Pull out the coupling sleeve, and turn it so that it cannot snap back.
- (iii) Engage the boss on the side of the loading lever with the collar retaining pin in the end of the feed shaft, and move it so that the rounds are kept pressed against the lips of the magazine opening.

While this pressure is being exerted, push out the rounds one by one.

If the pressure is not continuously maintained, the rounds may fall over and cause a jam.

SECTION VII

MAIN WEIGHTS AND DIMENSIONS

Rate of fire ...	...	...	...	...	...	450 rds. per min.
Muzzle velocity ...	...	...	...	...	...	2,725 ft. per sec.
Rifling ...	Concentric R.H. twist 1 turn in 720 mm. 9 grooves. Rifled for 4 ft. 1 in.					
Feed ...	...	...	...	...	...	Magazine
Magazine capacity ...	30-round Box Type or 60-round Drum Type					
Overall length of gun ...	...	...	...	...	...	7 ft. 0 in.
Length of barrel ...	...	...	...	...	...	4 ft. 9 in.
Weight of gun ...	...	...	...	...	...	126 lb.
Weight of barrel ...	...	...	...	...	...	31½ lb.
Weight of 60-round magazine empty ...	...	...	...	...	...	31½ lb.
Weight of 60-round magazine filled ...	...	...	...	...	...	64 lb.
Weight of 30-round magazine empty ...	...	...	...	...	...	14 lb.
Weight of 30-round magazine filled ...	...	...	...	...	...	30 lb.
Weight of 20 mm. ammunition per round ...	...	...	...	...	...	about ½ lb.

APPENDIX I

Gun, Machine, Polsten, 20 mm. Mk. I

LIST OF COMPONENTS IN ORDER OF STRIPPING

Plate Ref.	Cat. No.	Nomenclature	No. per Gun
A. & B.	BH 0250	Gun, Machine, Polsten, 20 mm., Mk. I	
C.	BH 0251	Barrel, Assembly	1
C.1	BH 0396	Barrel	1
C.2	BH 0315	Spring, stop, double loading ...	1
C.3	BH 0317	Stop, double loading	1
D.		Casing, Barrel, Group	1
D.1	BH 0287	Pin, split, cotter	2
D.2	BH 0255	Bush, cotter... ..	2
D.3	BH 0266	Cotter	1
D.4	BH 0258	Casing, barrel	1
D.5	BH 0303	Spring, barrel, short	1
		(Common to spring, barrel, right, Mk. I on the Oerlikon gun)	
D.6	BH 0301	Sleeve, springs, barrel	1
D.7	BH 0302	Spring, barrel, long	1
		(Common to spring, barrel, left, Mk. I on the Oerlikon gun)	
E.	BH 0288	Plug, body, assembly	1
E.1	BH 0393	Plug, body	1
E.2	BH 0297	Screw, catch, body plug	1
E.3	BH 0262	Catch, plug, body	1
E.4	BH 0308	Spring, plug, body	1
E.5	BH 0267	Bracket, retainer, firing, mechanism	1
E.6	BH 0395	Mechanism, firing, Mk. II, assembly	1
E.7	BH 0390	Casing, mechanism, firing, Mk. II ...	1
E.8	BH 0263	Catch, safety	1
E.9	BH 0286	Pin, sear	1
E.10	BH 0280	Pin, catch, sear	1
E.11	BH 0300	Sear	1
E.12	BH 0313	Spring, sear	1
E.13	BH 0264	Catch, sear	1
E.14	BH 0270	Guide, spring, sear catch	1
E.15	BH 0308	Spring, catch, sear	1
E.16	BH 0319	Trigger	1
E.17	BH 0311	Spring, trigger	1
E.18	BH 0318	Stop, rod, interlock	1
E.19	BH 0270	Guide, spring, interlock rod stop ..	1

APPENDIX I—contd.

GUN, MACHINE, POLSTEN, 20 MM. MK. I

LIST OF COMPONENTS IN ORDER OF STRIPPING

Plate Ref.	Cat. No.	Nomenclature	No. per Gun
		Mechanism, firing, Mk. II, assembly—contd.	
E.20	BH 0308	Spring, stop, interlock rod ...	1
E.21	BH 0391	Insert, casing, firing mechanism ...	1
F	BH 0397	Block, breech, assembly ...	1
F.1	BH 0253	Block, breech ...	1
F.2	BH 0272	Head, block, breech (common to Breech, facepiece on the Oerlikon gun) ...	1
F.3	BH 0309	Spring, head, breech block ...	1
F.4	BH 0283	Pin, hammer ...	1
F.5	BH 0271	Hammer ...	1
F.6	BH 0282	Pin, firing ...	1
F.7	BH 0298	Screw, plug, buffer ...	1
F.8	BH 0289	Plug, buffer ...	1
F.9	BH 0254	Buffer ...	1
	BH 0304	Spring, buffer, assembly ...	1
F.10	BH 0277	Nut, rod, buffer spring ...	1
F.11	BH 0305	Spring, buffer ...	44
F.12	BH 0295	Rod, spring, buffer ...	1
F.13	BH 0252	Bent, block, breech ...	1
G		Mechanism, double loading, group ...	1
G.1	BH 0287	Pin, split, double loading lever ...	1
G.2	BH 0255	Bush, lever, double loading ...	1
	BH 0275	Lever, double loading, assembly ...	1
G.3	BH 0249	Lever, double loading ...	1
G.4	BH 0285	Pin, roller, lever double loading ...	1
G.5	BH 0296	Roller, lever, double loading ...	1
G.6	BH 0310	Spring, lever, double loading ...	1
G.7	BH 0299	Screw, stop, barrel casing ...	1
G.8	BH 0276	Lever, stop, barrel casing ...	1
G.9	BH 0314	Spring, stop, barrel casing ...	1
G.10	BH 0316	Stop, casing, barrel ...	1
G.11	BH 0278	Pin, collar, double loading plunger ...	1
G.12	BH 0265	Collar, plunger, double loading ...	1
G.13	BH 0290	Plunger, double loading ...	1
G.14	BH 0399	Plug, plunger, double loading ...	1
	BH 0291	Retainer, barrel, assembly ...	1
G.15	BH 0248	Sleeve, retainer, barrel ...	1
G.16	BH 0284	Pin, retainer, barrel ...	1

APPENDIX I—contd.

GUN, MACHINE, POLSTEN, 20 MM. MK. I

LIST OF COMPONENTS IN ORDER OF STRIPPING—contd

Plate Ref.	Cat. No.	Nomenclature	No. per Gun
		Retainer, barrel, assembly—contd.	
G.17	BH 0273	Head, retainer, barrel	1
G.18	BH 0292	Retainer, barrel	1
G.19	BH 0311	Spring, retainer, barrel	1
H	BH 0392	Catch, interlock, assembly	1
H.1	BH 0287	Pin, split, magazine catch lever	1
H.2	BH 0255	Bush, lever, magazine catch	1
H.3	BH 0274	Lever, catch, magazine	1
H.4	BH 0261	Catch, magazine	1
H.5	BH 0307	Spring, catch, magazine	1
H.6	BH 0293	Retainer, catch, magazine	1
H.7	BH 0279	Pin, catch, interlock	1
H.8	BH 0294	Rod, interlock	1
H.9	BH 0256	Bush, rod, interlock	1
H.10	BH 0312	Spring, rod, interlock	1
H.11	BH 0260	Catch, interlock	1
H.12	BH 0306	Spring, catch, interlock	1
C		Body, Group	1
C.4	BH 0247	Body	1
C.5	BH 0278	Pin, cam, hammer	1
C.6	BH 0257	Cam, hammer	1
		Accessories to the gun	
N.	BH 1334	Attachment, cocking, Polsten 20 mm. M.G.	
M.20	BH 1246	Cover, muzzle, Polsten 20 mm. M.G., Mk. I	
N.	BH 1327	Firing-gear, Oerlikon or Polsten 20 mm. M.G.	
B.1	BH 1338	Lever, trigger, Polsten 20 mm. M.G.	
B.2	BH 1339	Screw, retaining, trigger lever, Polsten 20 mm. M.G.	
		Locknut $\frac{3}{8}$ B.S.F.	
		(Items BH 1327, BH 1338 and BH 1339 are only used when the gun is mounted on the Universal mounting)	

APPENDIX II

MAGAZINE, 30-RD. 20 MM. POLSTEN MK. I

LIST OF COMPONENTS

Plate Ref.	Cat. No.	Nomenclature	No. per Mag.
J. & K.	BH 1451	Magazine, 30-round, 20 mm. Polsten, Mk. I	
K.1	—	Case, assembly	1
K.2	BH 1455	Handle, carrying	1
K.3	BH 1458	Rivet, handle, carrying	2
K.4	BH 1452	Platform, left, assembly	1
K.5	BH 1457	Plunger, interlock	1
—	BH 1465	Spring, plunger, interlock	1
—	BH 1466	Washer, plunger, interlock	1
—	—	Pin, split, $\frac{1}{16}$ in. dia. \times 1 in. long	1
K.6	BH 1453	Platform, right	1
—	BH 1454	Spring, platforms, assembly	2
K.7	BH 1459	Spring, platforms, first leaf	2
K.8	BH 1460	Spring, platforms, second leaf	6
K.9	BH 1461	Spring, platforms, third leaf	2
K.10	BH 1462	Spring, platforms, fourth leaf	12
K.11	BH 1463	Spring, platforms, fifth leaf	2
K.12	BH 1468	Cap, spring, platforms	8
K.13	—	Stud, spring, platforms	2
—	BH 1469	Rivet, semi-tubular 11 S.W.G., $\frac{7}{32}$ in. long	24
—	BH 1464	Rivet, semi-tubular 11 S.W.G., $\frac{1}{4}$ in. long	18
—	BH 1470	Rivet, semi-tubular 11 S.W.G., $\frac{5}{32}$ in. long	24
K.14	BH 1456	Lever, loading	1
K.15	BH 1467	Plate, bottom	1

APPENDIX III

MAGAZINE, R.H., 20 MM. OERLIKON, MK. II

LIST OF COMPONENTS

Plate Ref.	Cat. No.	Nomenclature	No. per Mag.
J. & L.	BH 1150	Magazine, R.H., 20 mm. Oerlikon Mk. II	
L.1	BH 1158	Casing, spring, main, Mk. II R.H. Assembly	1
—	BH 1175	Spring, main	1
—	BH 1177	Casing, spring, main, Mk. II ...	1
—	BH 1496	Pin, securing, main spring ...	1
—	—	Feeder cartridge, Mk. III, R.H. Assembly	1
L.2	BH 1180	Arm, feed, R.H.	1
L.3	BH 1505	Bolt, articulating, Mk. I	2
L.4	BH 1484	Bolt, swivel, feed head	1
L.5	BH 1485	Feeder, cartridge, Mk. III	1
L.6	BH 1492	Head, feed	1
L.7	BH 1491	Link, feed	1
L.8	BH 1495	Pin, retainer, interlock plunger, Mk. III	1
L.9	BH 1481	Plunger, interlock, Mk. III	1
L.10	BH 1499	Roller, link, cartridge feeder ...	3
L.11	BH 1501	Sleeve, plunger, interlock, Mk. III	1
L.12	BH 1173	Spring, plunger, interlock	1
—	BH 1502	Washer, bolt, articulating	2
—	BH 1502	Washer, bolt, feed head swivel...	1
—	—	Pin, split, $\frac{1}{16}$ in. dia. \times $\frac{3}{4}$ in. long	3
—	—	Plate, front, R.H. assembly	1
L.13	BH 1170	Plate, front, R.H.	1
—	—	Register, casing, main spring ...	1
—	—	Plate, rear, R.H. assembly	1
L.14	BH 1166	Bearing, shaft, feed	1
L.15	BH 1171	Plate, rear, R.H.	1
L.16	—	Rivet, bearing, feed shaft	3
—	—	Shaft, feed Mk. I, R.H. Assembly	1
L.17	BH 1179	Block, feed, R.H.	1
L.18	BH 1162	Shaft, feed, Mk. I	1
—	—	Pin, taper $\frac{1}{4}$ in. dia. \times 2 in. ...	2
L.19	BH 1165	Block, indicator, Mk. I	1
L.20	BH 1152	Bolt, casing, magazine	8
L.21	BH 1155	Bolt, mouthpiece, long	2

APPENDIX III—contd.

MAGAZINE, R.H., 20 MM. OERLIKON, MK. II

LIST OF COMPONENTS—contd.

Plate Ref.	Cat. No.	Nomenclature	No. per Mag.
L.22	BH 1154	Bolt, mouthpiece, short	2
—	BH 1482	Bolt, stop, feed arm, long	1
L.23	BH 1483	Bolt, stop, feed arm, short	1
L.24	BH 1157	Casing, R.H.... ..	1
L.25	BH 1172	Collar, retaining, coupling sleeve spring, Mk. I	1
L.26	BH 1159	Cotter, mouthpiece	2
L.27	BH 1164	Handgrip, front, R.H.	1
L.28	BH 1163	Handgrip, rear, R.H.	1
L.29	BH 1178	Hub, spring, main, R.H.	1
L.30	BH 1167	Mouthpiece, R.H.	1
—	BH 1494	Nut, bolt, feed arm stop	2
L.31	—	Nut, bolt, magazine, 2 BA	8
L.32	BH 1169	Nut, bolt, mouthpiece	4
L.33	BH 1161	Pin, collar, retaining	1
L.34	BH 1488	Plate, cover, Mk. I	1
L.35	BH 1156	Screw, securing, cover plate	8
L.36	BH 1160	Sleeve, coupling, R.H.	1
L.37	BH 1174	Spring, sleeve, coupling	1
L.38	BH 1503	Washer, shaft, feed	1
L.39	—	Washer, securing (Seeger circlip external)	1
L.40	—	Washer, shakeproof, 10 mm. dia.	4
L.41	—	Washer, spring, single coil, $\frac{3}{16}$ in. dia.... ..	16
Accessories to the Magazine			
L.	BH 1227	Lever, loading, 20 mm. Oerlikon magazine, Mk. I	
L.	BH 1226	Frame, loading, 20 mm. Oerlikon magazine, Mk. I	

APPENDIX IV

MAGAZINE, L.H., 20 MM. OERLIKON, MK. II

LIST OF COMPONENTS

Cat. No.	Nomenclature	No. per Mag.
BH 1250	Magazine, L.H., 20 mm. Oerlikon, Mk. II	
BH 1487	Casing, spring, main, Mk. II, L.H. Assembly	1
BH 1177	Casing, spring, main, Mk. II	1
BH 1496	Pin, securing, main spring... ..	1
BH 1175	Spring, main... ..	1
	Feeder, cartridge, Mk. III, L.H. Assembly	1
BH 1489	Arm, feed, L.H.	1
BH 1505	Bolt, articulating, Mk. I	2
BH 1484	Bolt, swivel, feed head	1
BH 1485	Feeder, cartridge, Mk. III	1
BH 1492	Head, feed	1
BH 1491	Link, feed	1
BH 1495	Pin, retainer, interlock plunger, Mk. III... ..	1
BH 1481	Plunger, interlock, Mk. III... ..	1
BH 1499	Roller, link, cartridge feeder	3
BH 1501	Sleeve, plunger, interlock, Mk. III	1
BH 1173	Spring, plunger, interlock... ..	1
BH 1502	Washer, bolt, articulating... ..	2
BH 1502	Washer, bolt, feed head swivel	1
—	Pin, split, $\frac{1}{16}$ in. dia. \times $\frac{3}{4}$ in. long... ..	3
—	Plate, front, L.H. Assembly	1
BH 1497	Plate, front, L.H.	1
—	Register, casing, main spring	1
—	Plate, rear, L.H. Assembly	1
BH 1166	Bearing, shaft, feed... ..	1
BH 1498	Plate, rear, L.H.	1
—	Rivet, bearing, feed shaft	3
—	Shaft, feed, Mk. I, L.H. assembly	1
BH 1490	Block, feed, L.H.	1
BH 1162	Shaft, feed, Mk. I	1
—	Pin, taper, $\frac{1}{4}$ in. dia. \times 2 in. long... ..	2
BH 1165	Block, indicator, Mk. I	1
BH 1152	Bolt, casing, magazine	8
BH 1155	Bolt, mouthpiece, long	2
BH 1154	Bolt, mouthpiece, short	2
BH 1482	Bolt, stop, feed arm, long	1
BH 1483	Bolt, stop, feed arm, short	1
BH 1486	Casing, L.H.	1

APPENDIX IV.—*contd.*

MAGAZINE, L.H., 20 MM. OERLIKON, MK. II

LIST OF COMPONENTS—*Contd.*

Cat. No.	Nomenclature	No. per Mag.
BH 1172	Collar, retaining, coupling sleeve spring, Mk. I	1
BH 1159	Cotter, mouthpiece	2
BH 1506	Handgrip, front, L.H.	1
BH 1507	Handgrip, rear, L.H.	1
BH 1504	Hub, spring, main, L.H.	1
BH 1493	Mouthpiece, L.H.	1
BH 1494	Nut, bolt, feed arm stop	2
—	Nut, bolt, magazine, 2 BA	8
BH 1169	Nut, bolt, mouthpiece	4
BH 1161	Pin, collar, retaining, Mk. I	1
BH 1488	Plate, cover, Mk. I	1
BH 1156	Screw, securing, cover plate	8
BH 1500	Sleeve, coupling, L.H.	1
BH 1174	Spring, sleeve, coupling	1
BH 1503	Washer, shaft, feed	1
—	Washer, securing (Seeger circlip external)	1
—	Washer, shakeproof, 10 mm. dia.	4
—	Washer, spring, single coil, $\frac{3}{16}$ in. dia.	16

APPENDIX V

TOOLS AND ACCESSORIES

The following is a list of tools and accessories and their uses, for the Mk. I, 20 mm. Polsten machine gun.

<i>Plate Ref.</i>	<i>Cat. No.</i>	<i>Nomenclature</i>	<i>Use</i>
M.1	BH 0378	Awl, Polsten M.G. Mk. I	For lifting Breech block head spring For removing Double loading stop spring For assisting assembly of Firing Mechanism.
M.2	BH 1256	Case, reflector, mirror, 20mm. M.G.	
M.3	BH 0380	Drift, Polsten M.G. Mk. I	For removing Hammer cam.
M.4	BD 2000	Hammer, M.G., Mk. I	
M.5	—	Brush, oil (1 inch)	
M.6	BE 6167	Can, oil, M.G., Mk. III	
M.7	BH 1244	Plug, clearing, Polsten 20 mm. M.G., Mk. I—same as tool withdrawing separated case Oerlikon	For withdrawing separated cases.
M.8	BH 0377	Punch, centre, Polsten M.G., Mk. I	For removing and retaining Hammer pin. Double loading plunger collar pin, Double loading lever roller pin and barrel retainer pin.
M.9	BH 0376	Punch, Polsten M.G., Mk. I	
M.10	BH 1255	Reflector, Mirror 20 mm. M.G.	
—	BH 0381	Rod, Cleaning, Polsten 20 mm., M.G., Mk. I (Comprising)	Cleaning purposes.
M.11	BH 0384	Brush (1)	
M.12	BH 0303	Handle (1)	
M.13	BH 0385	Loop (1)	
M.14	BH 0386	Plug (1)	
M.15	BH 0387	Sections (3)	
M.16	BH 0379	Screwdriver, Polsten M.G., Mk. I	For removing Hammer pin, Buffer plug screw, Barrel casing stop screw and clearing plug if too tight to remove by hand.
M.17	BH 1242	Tin, grease, Oerlikon 20 mm., M.G.	
M.18	BH 0375	Tool, Combination, Polsten 20 mm. M.G., Mk. I	For removing and carrying Barrel. For removing buffer plug, Barrel retainer assembly Breech block head, body plug, Buffer spring rod nut and split pins.
M.19	BH 0382	Chest, Polsten 20 mm. M.G., Mk. I	For carrying one complete gun and one spare barrel.

APPENDIX VI

STOPPAGES

NOTE :—

IN ALL CASES OF A STOPPAGE THE GUN MUST FIRST BE COCKED AND THE SEAR ENGAGED BEFORE THE MAGAZINE IS REMOVED. FOR DRILL IN CORRECTING STOPPAGES THE APPROPRIATE S.A.T. PAMPHLET SHOULD BE CONSULTED.

The following is a table of general stoppages with possible causes :—

STOPPAGE TABLE

<i>Position of Breech Block</i>	<i>Stoppage</i>	<i>Possible Cause</i>
Partly Open	Mal-ejection, Empty case trapped in body.	(a) Excessive friction between recoiling parts and body due to improper cleaning.
Jammed half-way	Misfeed, Bent round in breech opening	(a) Magazine tension sluggish due to dirt or magazine incorrectly filled.
Fully forward	No feed	(a) Defective magazine. (b) Empty magazine with defective plunger.
Fully forward	Misfire, Round in chamber	(a) Lightly struck cap possibly due to :— (i) Defective cartridge cap. (ii) Damaged firing pin or hammer. (b) Round in front of lip on the breech block head.

Note :—The presence of a round or separated case in the chamber will be indicated by the barrel casing stop, which will be in such a position that it will interfere with the path of travel of the pads on the barrel casing. During rearward movement of the barrel casing, the pads will ride under the spring loaded barrel casing stop. On commencement of the forward movement, the barrel casing will be arrested by the pads contacting the rear face of the barrel casing stop.

Care must be taken, when clearing a stoppage with a round in the chamber if several magazines have been fired rapid and the barrel is very hot. **In these circumstances, the round in the chamber may be fired by the heat from the barrel.**

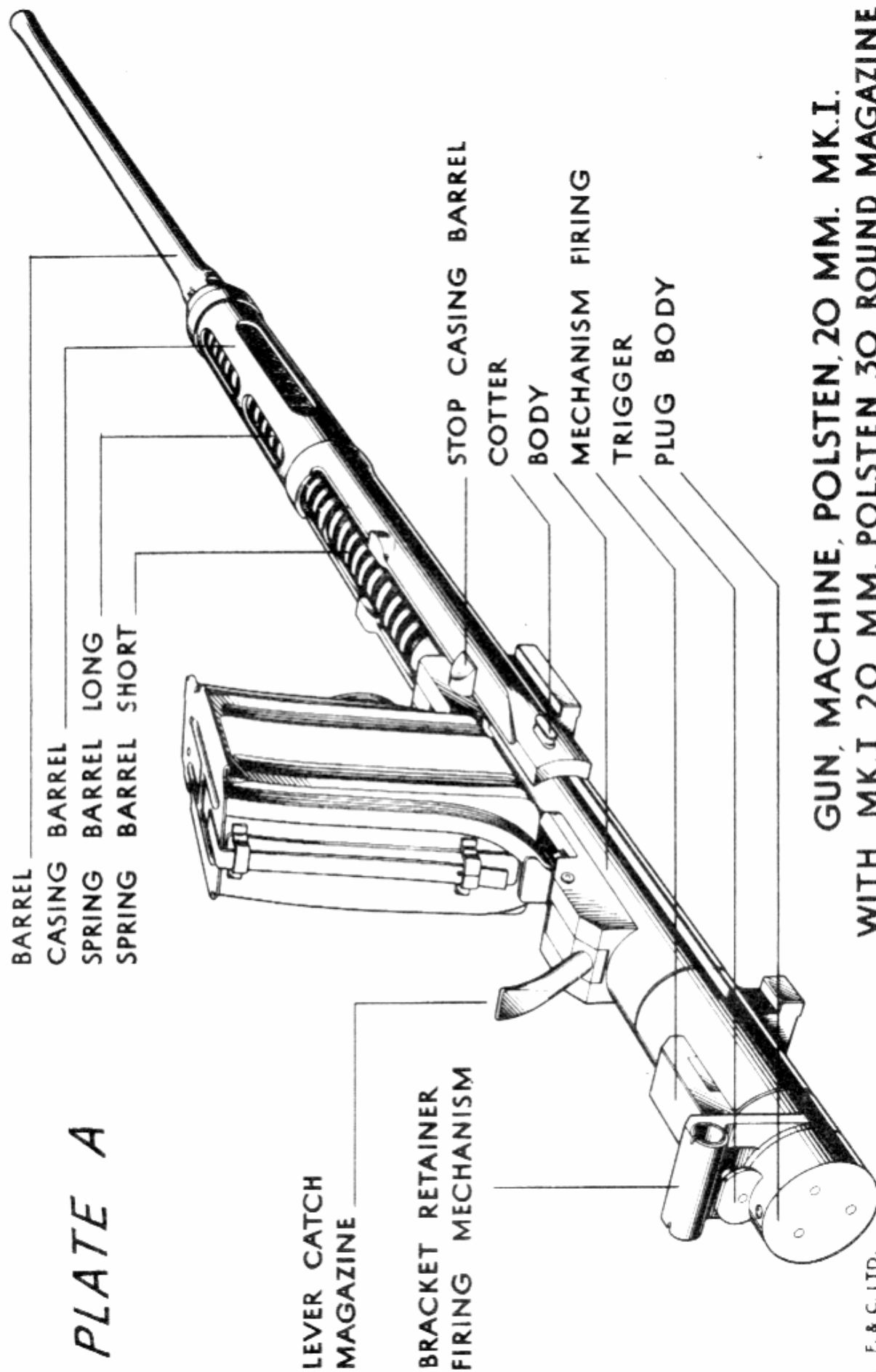
As a guide, after firing 300 rounds rapid, a round in the chamber may "cook off" at any moment within 7 minutes of being fed.

A plug (M.14) which can be screwed to the cleaning rod, is provided to push an H.E. round out of the chamber from the muzzle end. It is shaped so that it will not press on the nose of the projectile, and thereby run the risk of detonating it.

NOTE :—Before using this tool, sufficient time must be allowed to elapse to prevent any danger to personnel, due to a possible "cook off." For the drill laid down, reference should be made to the relevant S.A.T. pamphlet.

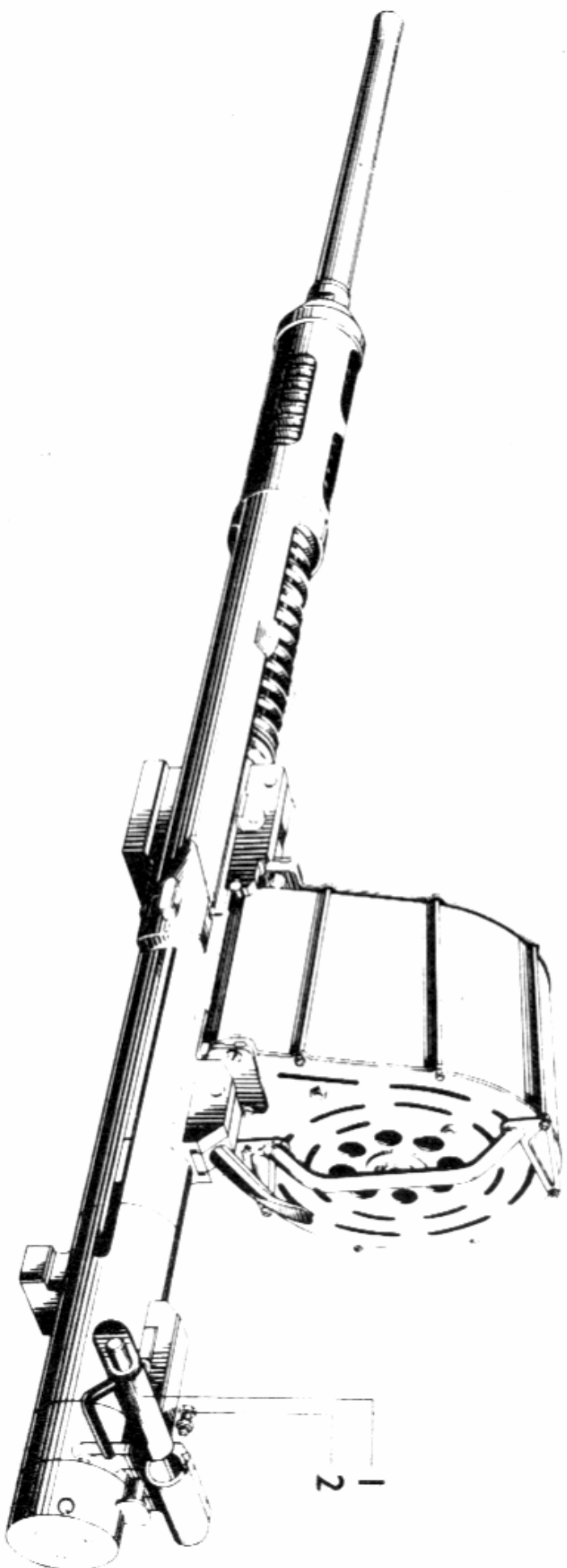
NOTES

PLATE A

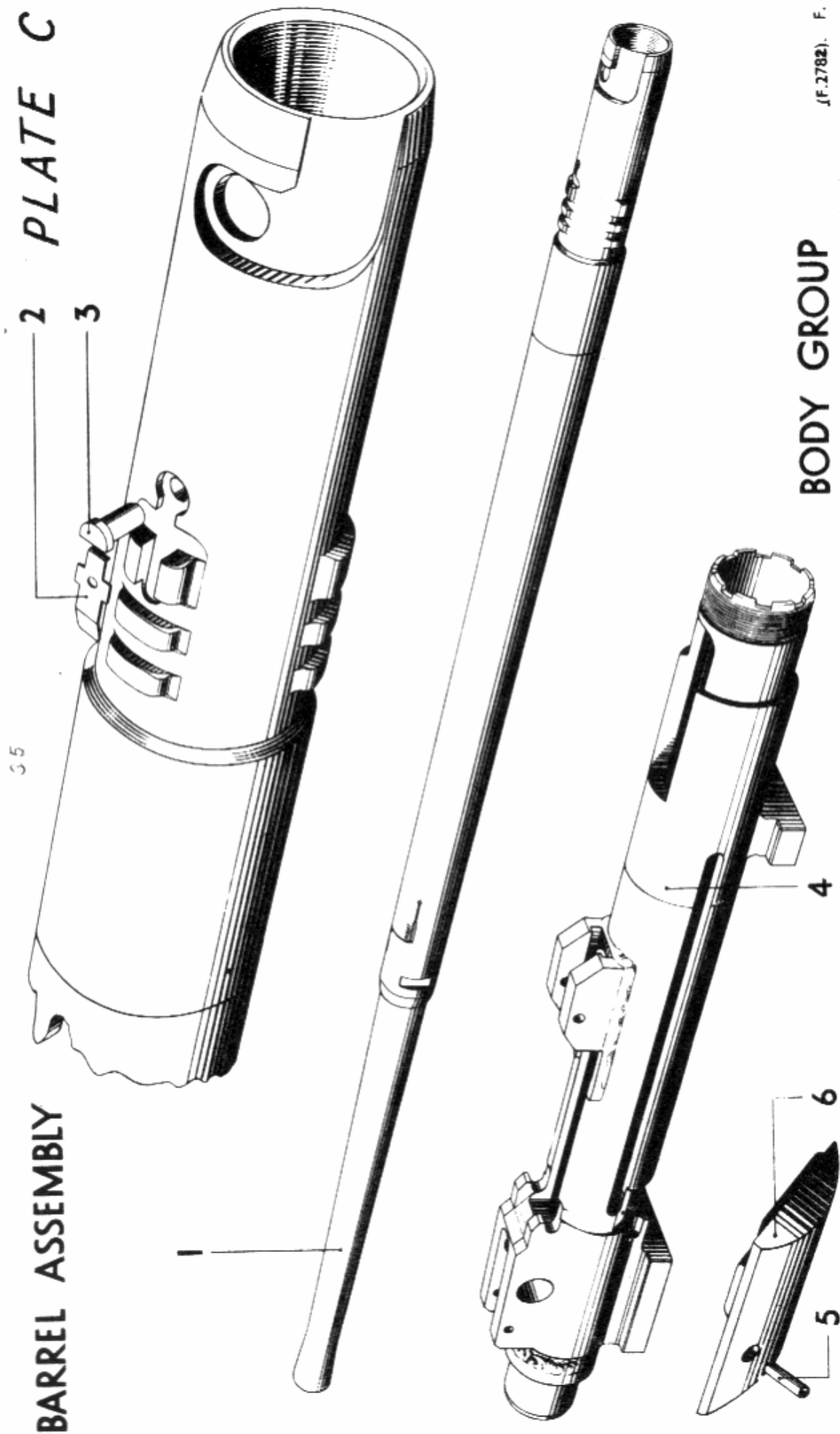


GUN, MACHINE, POLSTEN, 20 MM. MK.I.
WITH MK.I. 20 MM. POLSTEN 30 ROUND MAGAZINE

PLATE B



GUN, MACHINE, POLSTEN, 20 MM. MK.I.
WITH MK.II 20 MM. OERLIKON RIGHT HAND MAGAZINE



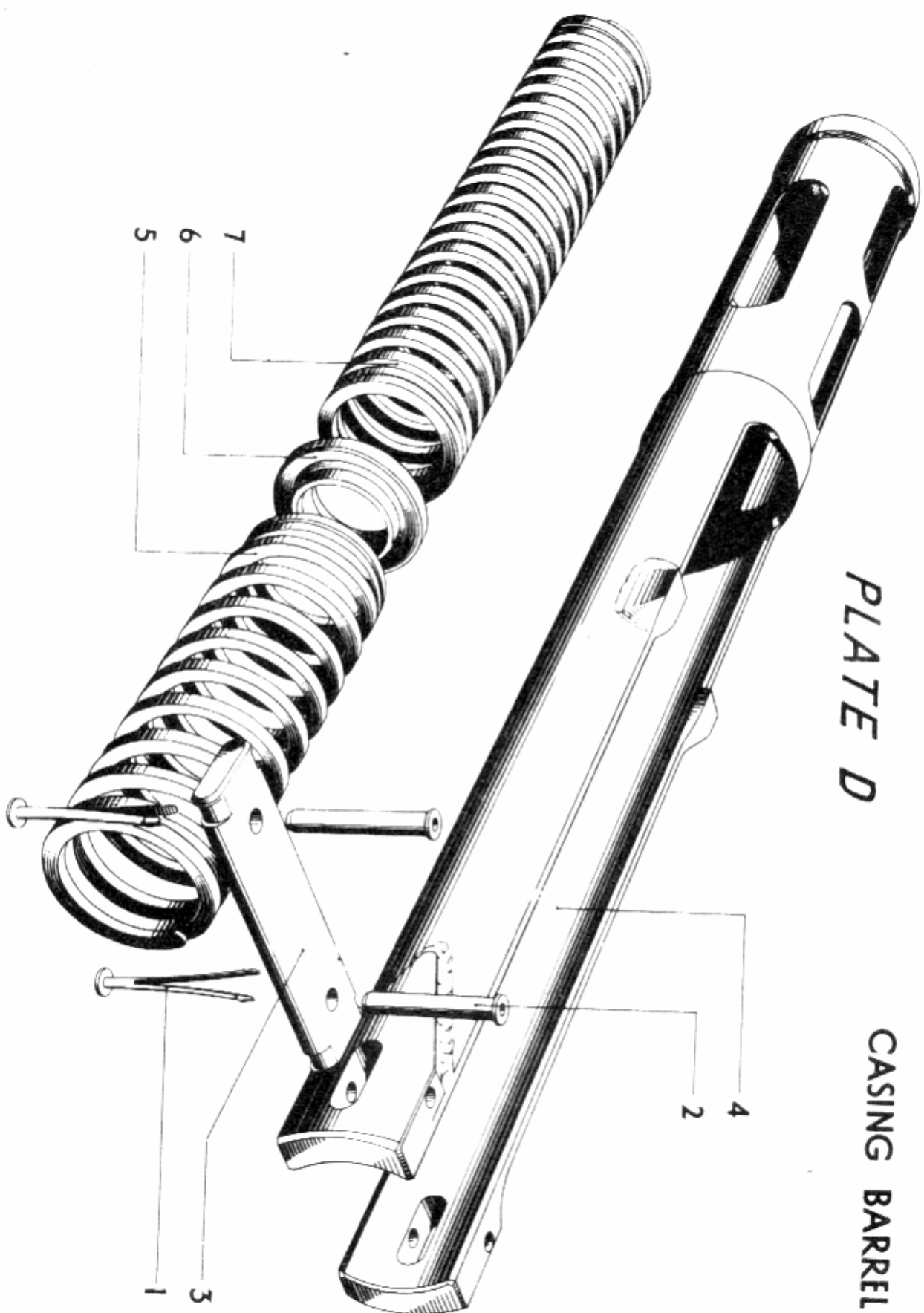
BARREL ASSEMBLY

PLATE C

BODY GROUP

PLATE D

CASING BARREL GROUP





PLUG BODY ASSEMBLY

(F.2782). Wt. 51262. 10000. 2/44. Gp. 959. FOSH & CROSS LTD.

BLOCK BREECH ASSEMBLY

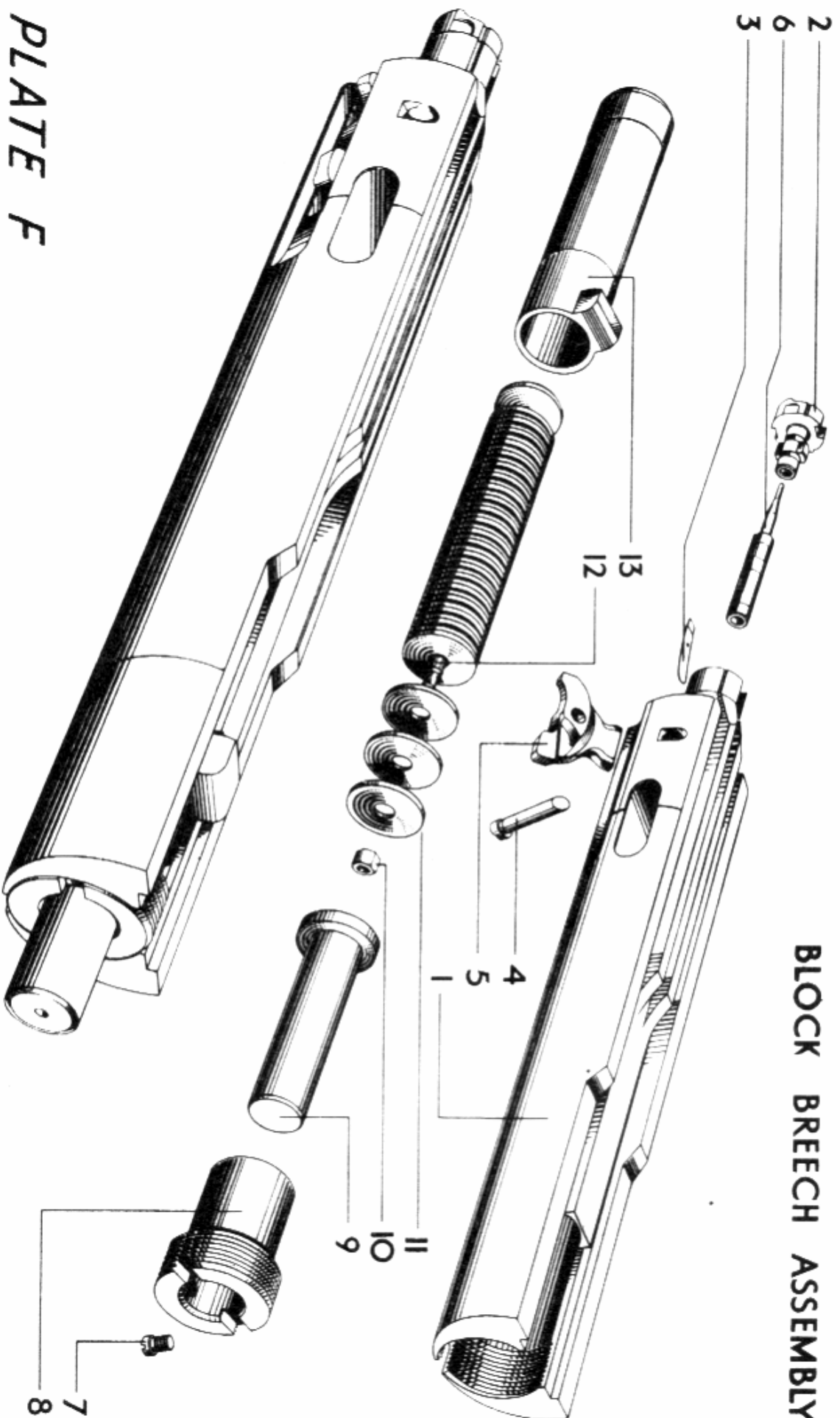
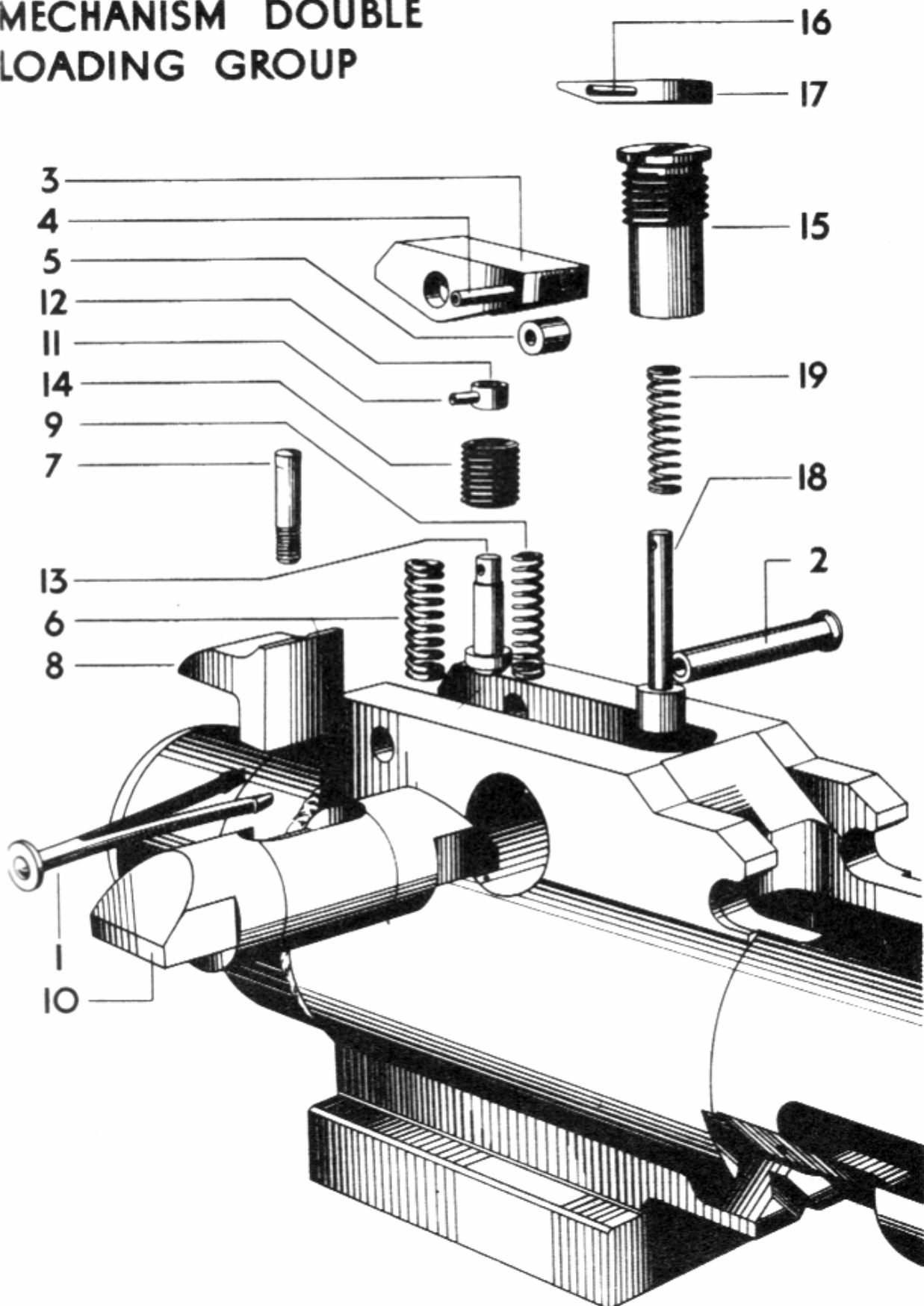


PLATE F

RETAINER BARREL ASSEMBLY

MECHANISM DOUBLE LOADING GROUP



CATCH INTERLOCK ASSEMBLY

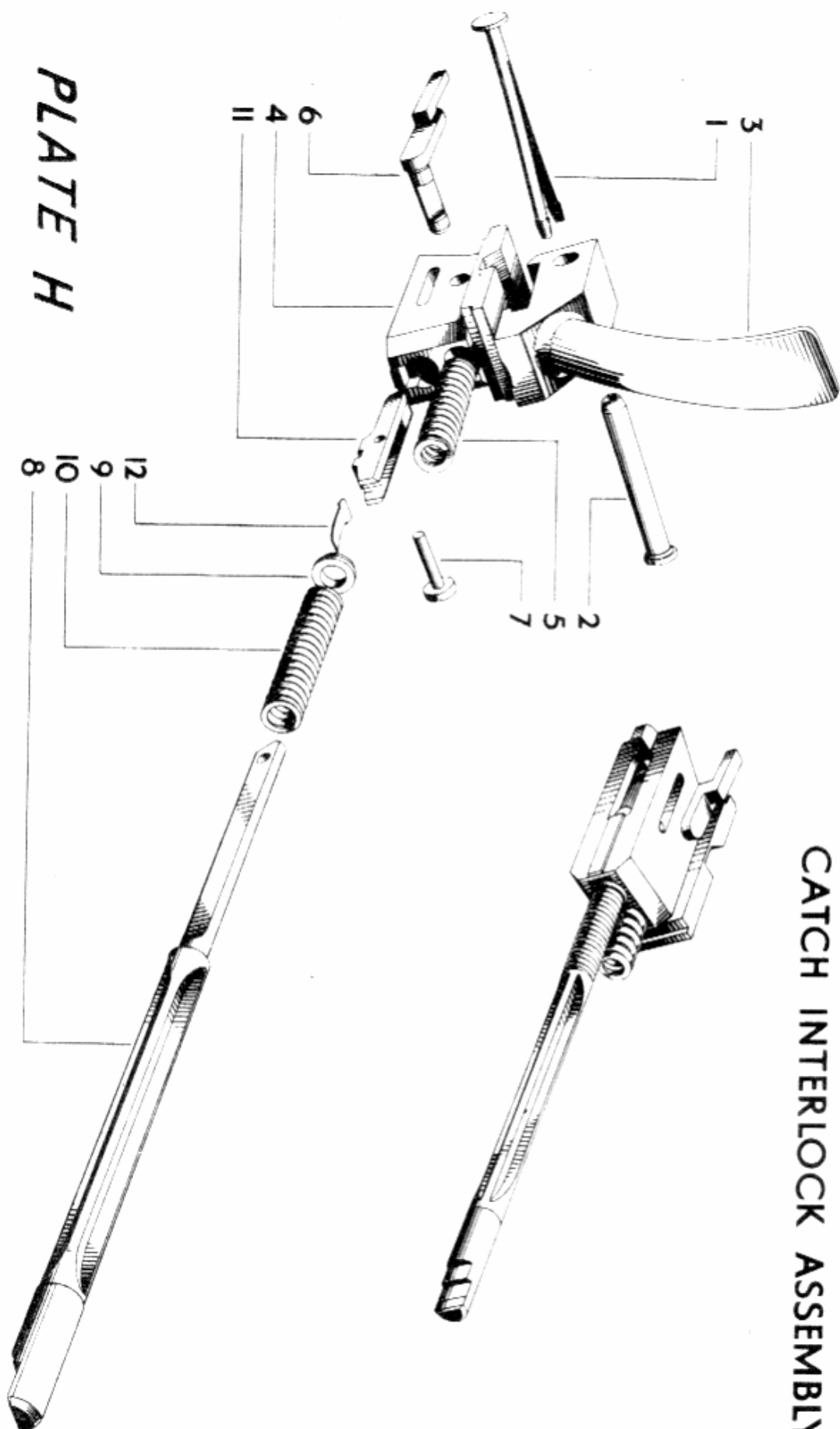
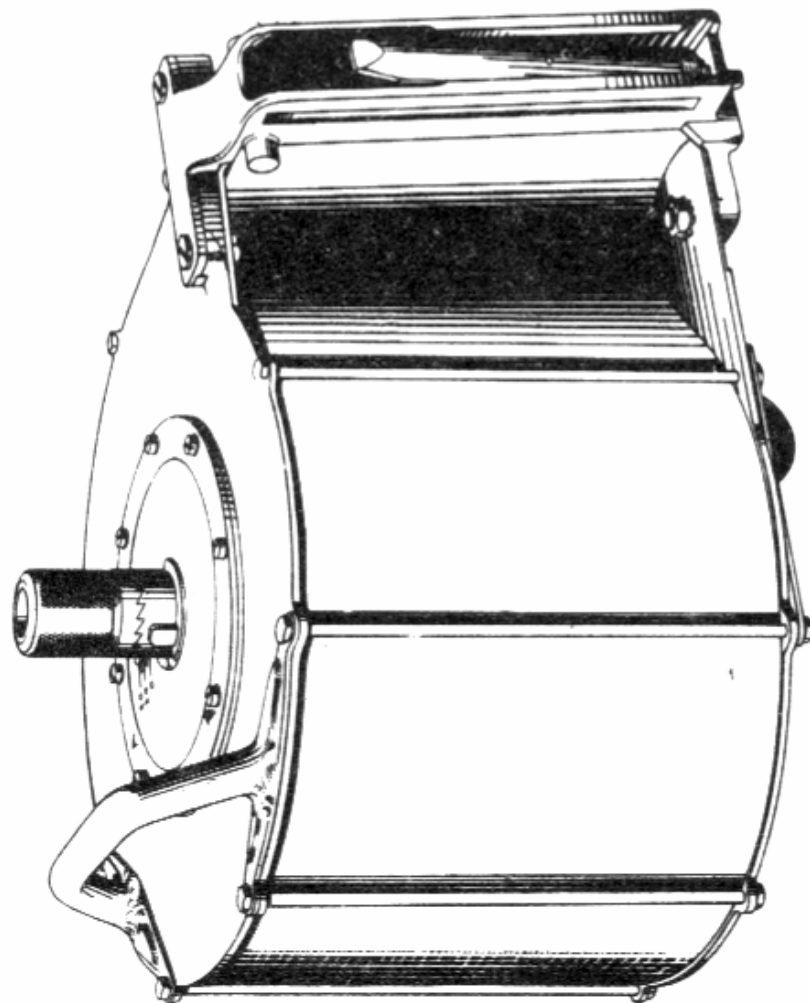


PLATE H

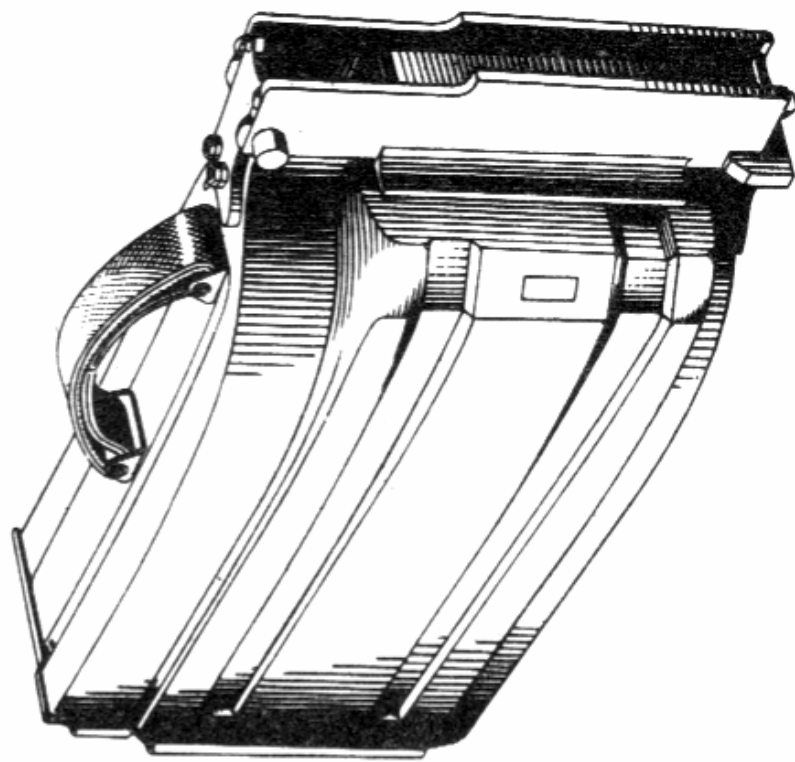
PLATE J



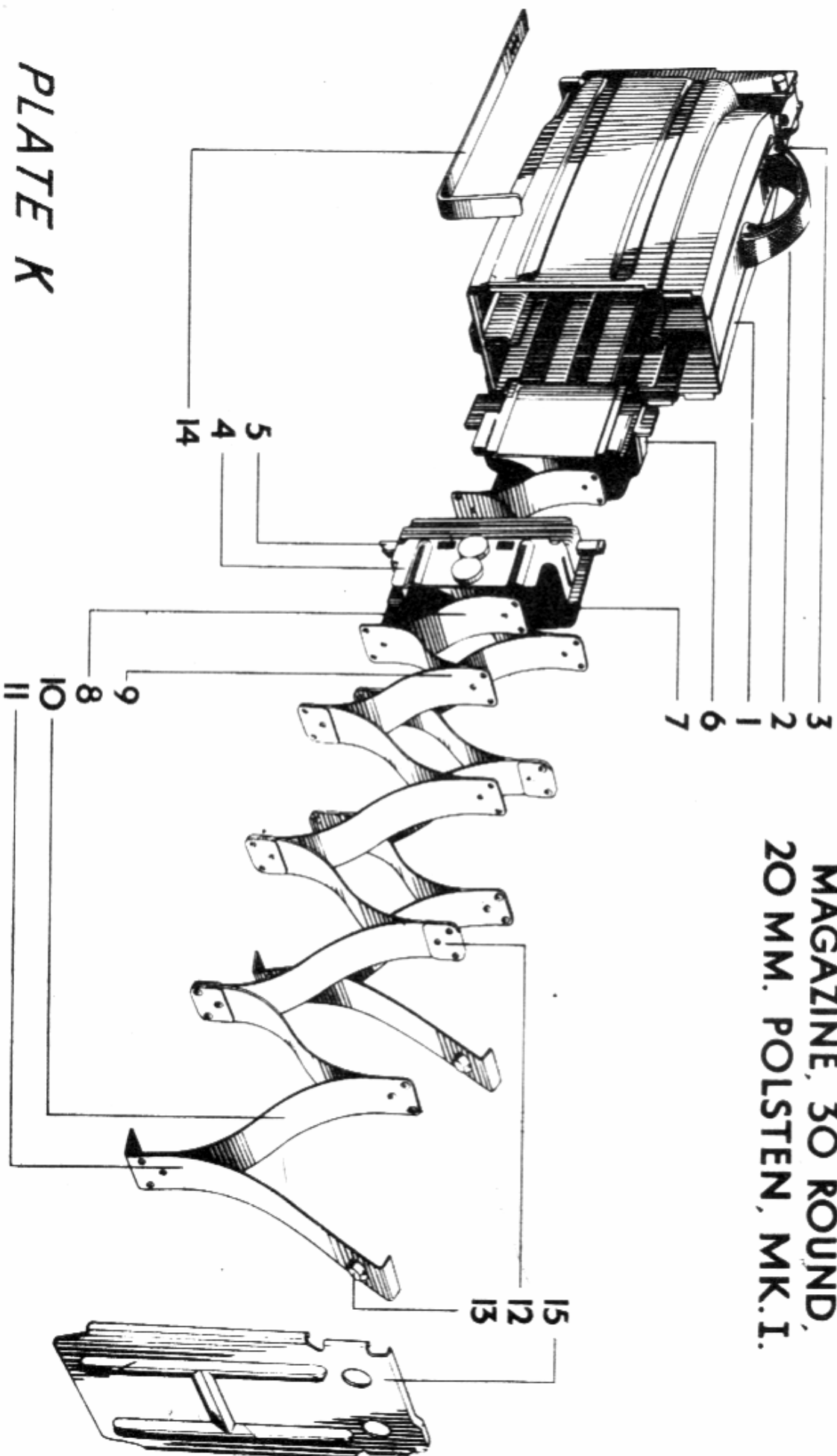
**MAGAZINE, RIGHT HAND,
20 MM. OERLIKON, MK. II.**

(F.2762). F. & C. LTD.

**MAGAZINE, 30 ROUND,
20 MM. POLSTEN, MK. I.**



**MAGAZINE, 30 ROUND,
20 MM. POLSTEN, MK.I.**



MAGAZINE, RIGHT HAND, 20 MM. OERLIKON, MK.II.

PLATE L

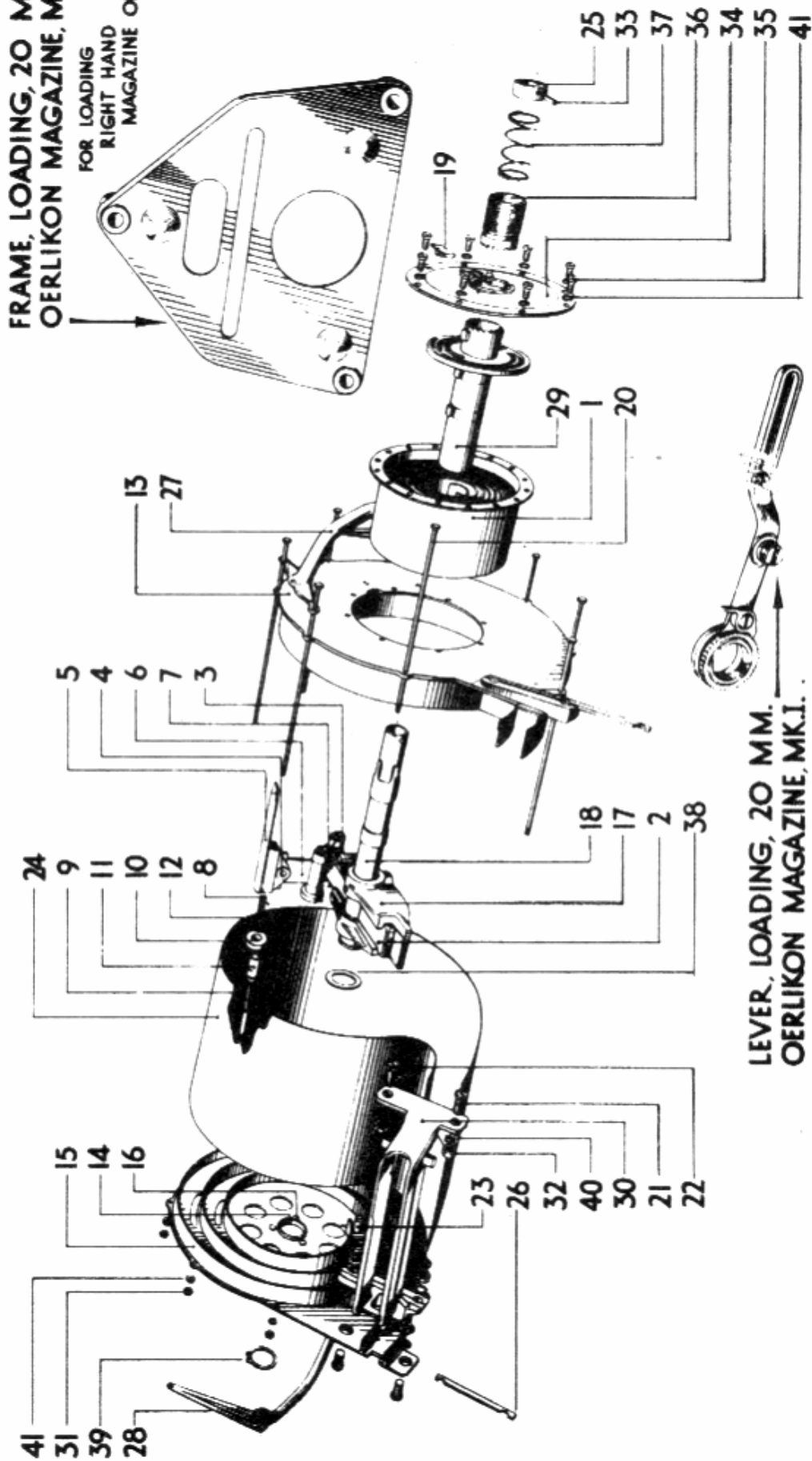
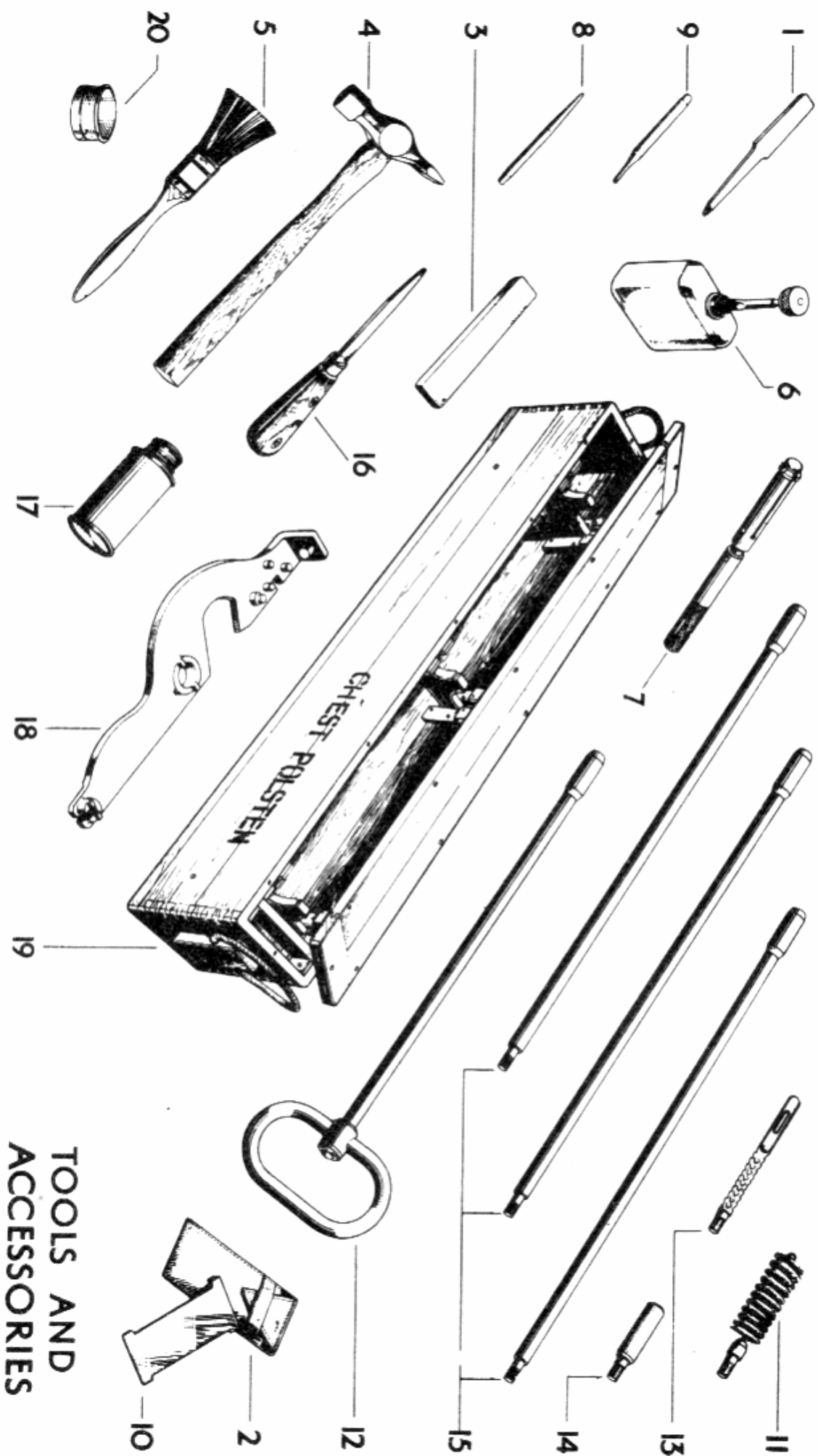
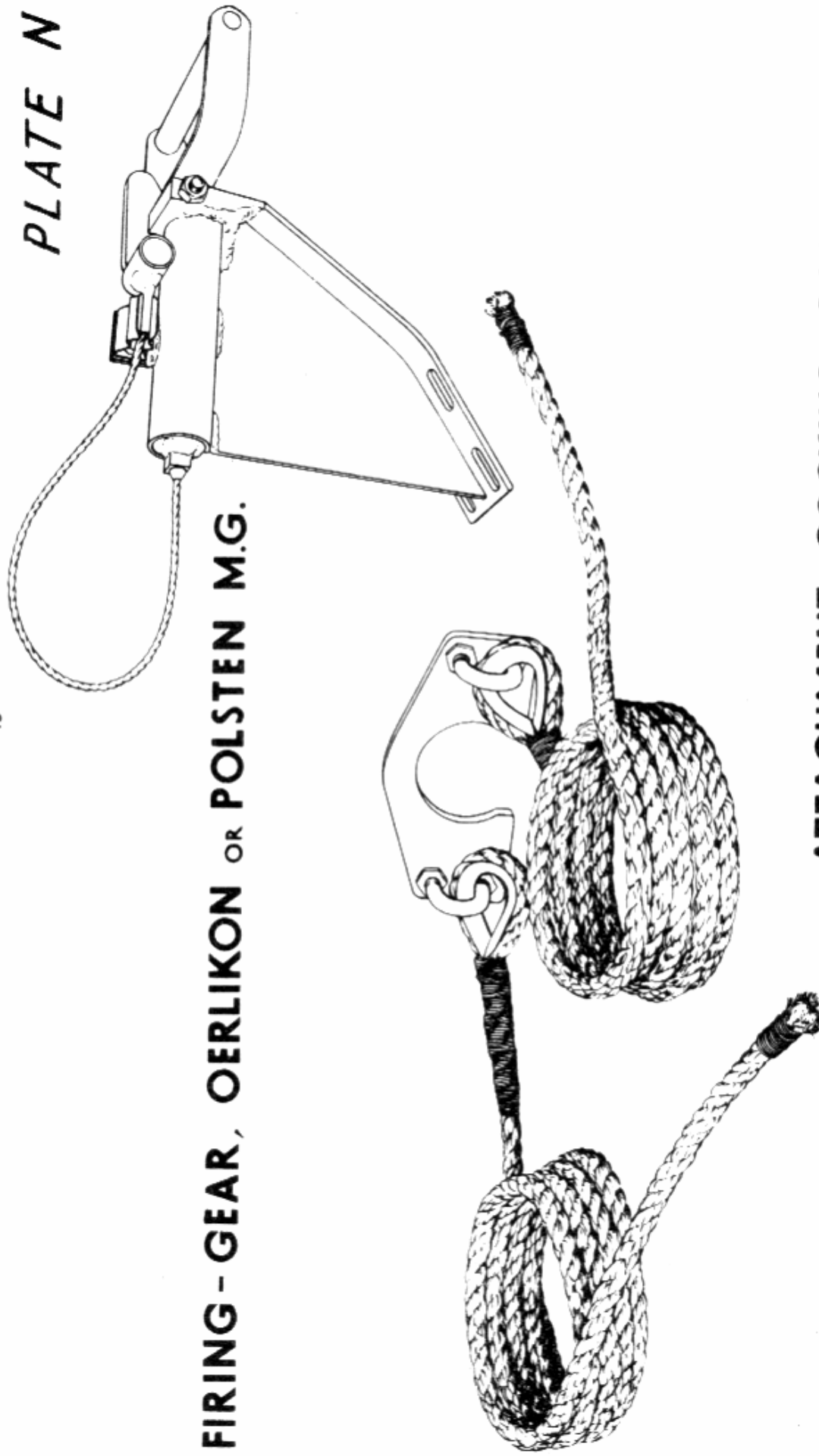


PLATE M



TOOLS AND
 ACCESSORIES

*PLATE N***FIRING - GEAR, OERLIKON OR POLSTEN M.G.**

(F.2782). F. & C. LTD.

ATTACHMENT COCKING, POLSTEN, M.G.

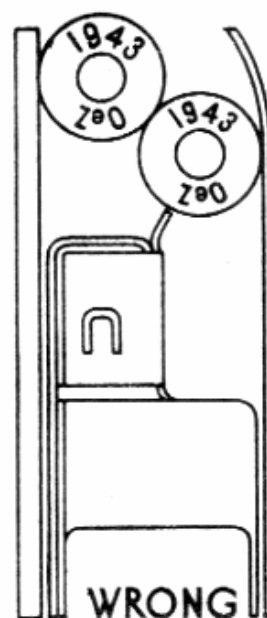
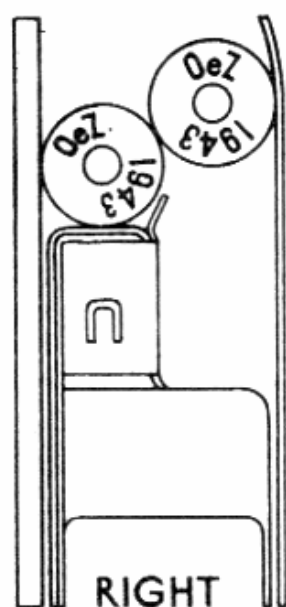


FIG. A

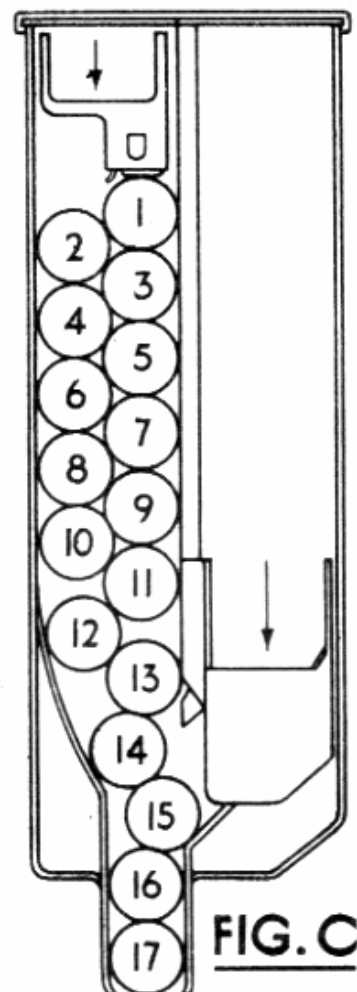
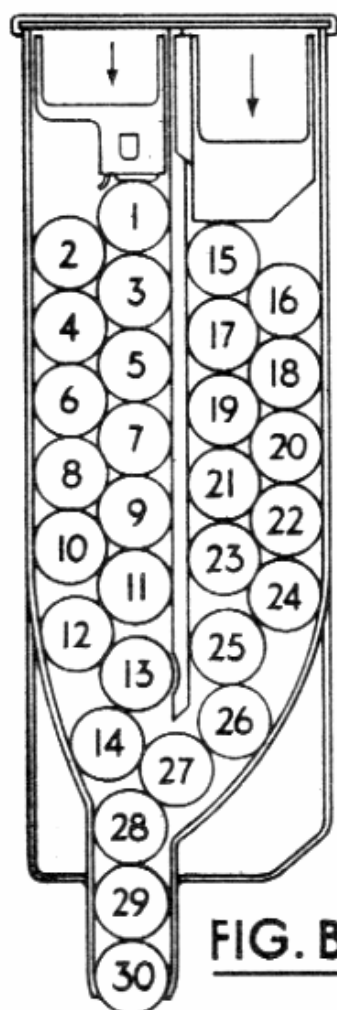


DIAGRAM SHOWING POSITIONING OF
ROUNDS IN 30 ROUND POLSTEN MAGAZINE

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NOTE.—References to the plates in the text of the handbook and in the Appendices are given as a letter followed by a number.